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The seven working papers on linguistic theory contained in this volume include: "Two Properties of the Intransitive Resultative Construction" (Yoichi Miyamoto); "Multiple Subject Construction in Korean: A Functional Explanation" (Youngjun Jang); "Constraints on Noun Incorporation in Korean" (Hangyoo Khym); "Binding Principle for Long-Distance Anaphors" (Dong-Ik Choi); "Functional Projections and Event Structure" (Hangyoo Khym, Supath Kookiattikoon); "Against IP-Adjunction Scrambling" (Makoto Yamada); and "External Evidence and Syllable Structure." (Marcellino Berardo). (MSE)

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edited by

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TWO PROPERTIES OF THE INTRANSITIVE RESULTATIVE CONSTRUCTION

Yoichi Miyamoto
Ohio University

Abstract: This paper argues that the intransitive resultative construction requires head-movement of the secondary predicate to the main predicate in order to assign the theta-role to the postverbal NP in LF. Then, this construction is taken as an instance in which theta-role assignment is derivational. This supports Bowers, 1993; Chomsky, 1993, 1995; Larson, 1988, among others. The analysis presented in this paper then leads to the conclusion that D-structure and S-structure, if they exist, do not play any crucial role with respect to theta-role assignment and the Projection Principle, cannot be maintained as stated in Chomsky, 1981. What is required is that all theta-relations must be established by LF.

1 Introduction

This paper examines two properties of the intransitive resultative construction, which is exemplified in (1a,b). These examples are from Carrier and Randall (C&R, hereafter: 1992).

(1)a. The joggers ran their Nikes threadbare.
b. He sneezed the handkerchief soggy.

The interpretation of (1a) is that the joggers ran, and as a result of this running, their Nikes became threadbare. (1b) describes the situation in which someone sneezed, and as a result of his sneezing, the handkerchief became soggy.

Two properties which I will examine in this paper are [1] that in examples like (1a,b), the NP which occupies a postverbal position behaves like an adjunct in overt syntax but like an argument in LF, and [2] that examples like (1a,b) allow resultative interpretation, but not depictive interpretation. For instance, (1a) cannot mean that when Nikes were threadbare, the joggers ran.

In order to examine these two properties, this paper is organized as follows. Section 2 discusses these properties in detail. In this section, I will introduce a restriction on the occurrence of an object-oriented secondary predicate (OSP, hereafter), and work by C&R (1992, 1993), which argues for the (non-)argument status of the postverbal NP in the (in)transitive resultative construction. This section will also deal with C&R's

evidence that the postverbal NP of the intransitive resultative construction behaves like an argument. In Section 3, I will first introduce an analysis of adjunct secondary predicates which I will assume in this paper. Then, I will examine the intransitive resultative construction, and propose that in the intransitive resultative construction, the postverbal NP obtains an argument status when the head of the secondary predicate is incorporated into the head of the main predicate. Based on this raising analysis, I will account for the two properties of the intransitive resultative construction in Section 4. Then, in Section 5, I will deal with Op-movement in the intransitive resultative construction. Finally, Section 6 contains concluding remarks.

2 Two Questions Regarding the Intransitive Resultative Construction

The Postverbal NP Requirement It is known (e.g., Simpson, 1983, C&R, 1992, and Rothstein, 1983, 1992) that resultative secondary predicates may be predicated only of a direct object.[1] Consider first the following examples:

(2)a. John painted the house red.
b. John cut the meat thin.

Both of these examples contain a direct object, and thus, the above restriction is not violated. Let's now turn to the following examples:

(3)a. John laughed himself tired.
b. John laughed tired.

(3a) means that John laughed, and as a result, he became tired. In this example, because of the restriction on the resultative construction, the reflexive *himself* is inserted. (3b), on the other hand, cannot describe the same situation. Rather, it describes the situation in which John laughed and John was also tired. Because no direct object is present in this example, it does not allow the resultative interpretation. The only interpretation available to this example is thus the depictive interpretation. Then, the remaining question is why (3a) does not allow the depictive interpretation.

The Status of the Postverbal NP Although the postverbal NP must be present in the intransitive resultative construction as well as in the transitive resultative construction, C&R (1992, 1993) provide three pieces of evidence for the claim that only the postverbal NP of the latter construction is an argument.

First, the transitive resultative construction allows middle formation, while the intransitive resultative construction does not. Witness the following contrast:

(4)a. My running socks$_1$ won't wash t_1 clean.
b. New seedlings$_1$ water t_1 flat easily.

(5)a. *This type of pavement$_i$ runs t_i thin easily.
b. *Delicate feet$_i$ walk t_i to pieces easily.

Although Keyser and Roeper (1984) argue that passives and middles involve the same two operations; namely, the suppression of the predicate's external argument and its ability to assign accusative case, Fagan (1988) notes that middle formation is more restricted than passive formation. Consider the following examples adopted from C&R (1992):

(6)a. The politician was laughed at.
b. *Politicians laugh at easily.

Considering this contrast, C&R propose that the middle formation applies to a verb only if it has a direct internal argument. Given this restriction, the contrast between (4a,b) and (5a,b) shows that only the transitive resultative construction has a direct internal argument.

Second, only the transitive resultative construction allows nominal formation, as shown in the contrast between (7a,b) and (8a,b):

(7)a. The painting of fire engines the color of school buses is strictly prohibited by state law.
b. The surgeon general warns against the cooking of food black.

(8)a. *The talking of one's confidant silly is a bad idea.
b. *Inebriation is often accompanied by the laughing of oneself sick.

Chomsky (1986b) argues that nouns are inherent Case assigners, and that inherent Case is associated with theta-marking. Thus, theta-marking is required for a postnominal NP to receive Case. Given this proposal, in (7a,b), *school buses* and *food* are assigned theme theta-roles from the main predicates, and thus, receive inherent Case. If *one's confidant* and *oneself* in (8a,b) were arguments of the Ns, there would be no obvious reason why these NPs could not receive inherent Case from the Ns. Given that this line of analysis is correct, the contrast between (7a,b) and (8a,b) constitutes evidence for the claim that only the transitive resultative construction has a direct internal argument.

Finally, adjectival passive formation is possible only in the transitive resultative construction. (9a,b) contrast with (10a,b):

(9)a. the spun-dry clothes
b. the squashed-flat grapes

(10)a. *the laughed-sick teenagers
b. *the run-thin pavement

Levin and Rappaport (1986) show that the adjectival passive formation applies to a verb only if it has a direct internal argument. Then, the grammatical contrast between (9a,b) and (10a,b) indicates that only the transitive resultative construction has a direct internal argument.

So far, C&R's (1992, 1993) evidence indicates that the postverbal NP in the intransitive resultative construction is not a direct internal argument. However, there is another evidence which suggests that the postverbal NP behaves like an argument. Consider the following examples from C&R (1992):

(11)a. ?Which metal do you wonder who hammered flat?
b. ?Which metal do you wonder whether to hammer flat?

(12)a. ?Which sneakers do you wonder who ran threadbare?
b. ?Which sneakers do you wonder whether to run threadbare?

The grammaticality of these examples is parallel to that of (13a,b) which involve extraction of arguments out of WH-islands, but it is clearly different from that of (14a,b) which involve extraction of adjuncts out of WH-islands:

(13)a. ?Which boys do you wonder whether to punish?
b. ?Which guests do you wonder which dishes to serve?

(14)a. *How do you wonder whether to punish these boys?
b. *How do you wonder which boys to punish?

This parallelism between arguments and postverbal NPs in the intransitive resultative construction with respect to extraction thus constitutes evidence for the argument status of postverbal NPs in the intransitive resultative construction.

The movement of WHs in (11a, 12a) and (11b, 12b) can be schematized roughly as follows:

(15) $[_{CP}WH_1 \ldots [_{VP}t_1'' [_{VP} \ldots [_{CP}WH_2 [_{AGRP} t_1' [_{AGRP} t_2 [_{TP} \ldots [_{VP} \ldots t_1 \ldots]]]]]]]]$

(16) $[_{CP}WH_1 \ldots [_{VP}t_1'' [_{VP} \ldots [_{CP}$ whether $[_{AGRP} t_1' [_{AGRP} [_{TP} \ldots [_{VP} \ldots t_1 \ldots]]]]]]]]$

No matter how the marginality of these examples is accounted for, we should notice that when it comes to WH-movement, the postverbal NP of the intransitive resultative construction behaves parallel to that of its transitive counterpart. In other words, it acts

like an argument. The question to be raised is then why the postverbal NP of the intransitive resultative construction behaves like an adjunct in the above three respects, and acts like an argument in this respect.

3 Towards Solutions to the Two Questions

Secondary Predicates and the Stage-Level/Individual-Level Distinction[2] Kratzer (1989) shows that the subject of an individual-level predicate is sensitive to the tense of a sentence.[3] Consider (17a-d):

(17)a. Aunt Theresa resembled my grandmother.
b. My grandmother resembled Aunt Theresa.
c. Aunt Theresa resembles my grandmother.
d. My grandmother resembles Aunt theresa.

Suppose that Aunt Theresa is alive, but the grandmother is already dead. In this context, (17b) and (17c) are true, but (17a) and (17d) are false or are cases of presupposition failure. This fact is naturally accommodated, she argues, if the tense predicate of (17a-d) applies to the external argument of the main predicate. If the subject of an individual-level predicate occupies TP SPEC, and receives a theta-role of the complex of tense and the matrix predicate, the sensitivity of the subject of an individual-level predicate to tense naturally follows.

Further, the following paradigm suggests that the event argument of a stage-level predicate seems to be sensitive to the past/non-past distinction, as the subject of an individual-level predicate is:

(18)a. John is happy right now.
b. *John is happy yesterday.
c. *John was happy right now.
d. John was happy yesterday.

Since Davidson (1967), it has been argued (e.g., Kratzer, 1989) that temporal expressions like *right now* and *yesterday* modify the event argument.[4] For instance, (18a) may have the following semantic representation:

(19) event e: happy (j,e) & right now (e)

Given this assumption, the above paradigm can be accounted for in the following manner. Suppose that the event argument is sensitive to the past/non-past distinction. Then, the interpretation of the event in (18a,b) is:

(20) e is a non-past event of John's being happy.

Since this event is non-past, *yesterday* cannot modify this event, causing a semantic anomaly in (18b). On the other hand, *right now*, as in (18a), can successfully modify this event, since this temporal expression is lexically specified to modify a non-past event. The opposite situation is obtained, if the event is past as in (18c,d). Since the event argument receives the past event theta-role, only *yesterday* can modify the event. (18a-d) then can be taken as evidence for the hypothesis that the event argument of a stage-level predicate is sensitive to tense. If this event argument appears in TP SPEC, as the subject of an individual-level predicate does, the sensitivity of this event argument to tense is naturally expected.

Kratzer adopts (21) to guarantee that the most external argument is realized as an argument of the tense predicate.

(21) Argument Linking
In deep structure, all arguments except the external argument are realized within the maximal projection of their predicate.

(Williams, 1981)

Further, she assumes the following theta-role hierarchy:

(22) Event > Agent > Experiencer > Theme

(Kratzer, 1989)

Given these assumptions, no matter whether a sentence contains a stage-level predicate or an individual-level predicate, the most external argument is realized outside the maximal projection of its predicate. For instance, *intelligent* has only a theme theta-role, and thus, this is considered the most external theta-role. Therefore, the phrase receiving this theta-role must be realized outside the maximal projection of this predicate. The verb *eat* has an event, an agent, and a theme theta-role. According to the theta-role hierarchy in (22), the event theta-role is considered its most external theta-role, and thus, the phrase with this theta-role must be realized outside the VP.

Although Kratzer's system appears to guarantee that the most external argument appears outside of the predicate, it is not clear why it has to appear in TP SPEC, not in AGRsP SPEC or AGRoP SPEC, for instance. Considering this, I replace (21) by (23):

(23) All predicates must be raised to tense in order to assign the most external theta-role.

According to (23), the most external argument is an argument of a complex predicate consisting of tense and a main predicate; i.e., a tense predicate. Then, it is natural that the most external argument occupies TP SPEC in order to receive a theta-role from the tense predicate. In languages such as French, where the predicate head moves overtly to

AGRs via tense (e.g., Belletti, 1990; Chomsky, 1991; Watanabe, 1993), *Jean* in (24) receives an experiencer theta-role in overt syntax:[5]

(24) $[_{AGRsP}Jean_1\ [_{AGRs'}aime_2\ [_{TP}t_1[_{T'}t_2'[_{VP}t_2$ la musique]]]]]
likes music
'Jean likes music.'

On the other hand, in languages such as English, verb raising takes place in LF (See the references above). The NP *John* in (25) is assigned an experiencer theta-role when the predicate head is raised to AGRs via tense in LF.

(25) $[_{AGRsP}John_1\ [_{AGRs'}likes_2\ [_{TP}t_1[_{T'}t_2'[_{VP}t_2$ music]]]]]

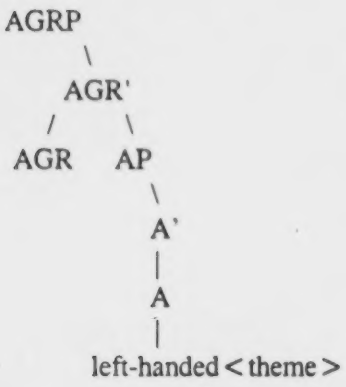
I further assume that event theta-roles allow theta-identification (Higginbotham, 1985). This hypothesis provides a principled account for the ungrammaticality of (26a-c), which show that individual-level predicates cannot appear either as a main predicate or as a secondary predicate in a sentence containing a secondary predicate.[6] These examples contrast with (26d):

(26)a. *John is happy left-handed.
b. *John is intelligent tired.
c. *John is intelligent left-handed.
d. John is happy tired.

Under (23), all the main predicates in these examples must be raised to tense in order to assign its most external theta-role.[7] What is particular to these examples is that the secondary predicates, in addition to the main predicates, must be associated with tense, either by theta-identification or by raising to tense, in order to assign their most external theta-role.

In (26a,c), on the assumption that the structure of the secondary predicate *left-handed* is as in (27), the head of this predicate must be raised to the matrix tense in order to assign its most external theta-role, namely its theme theta-role, since theta-identification is not available for theme theta-roles and there is no tense within AGRP.

(27)



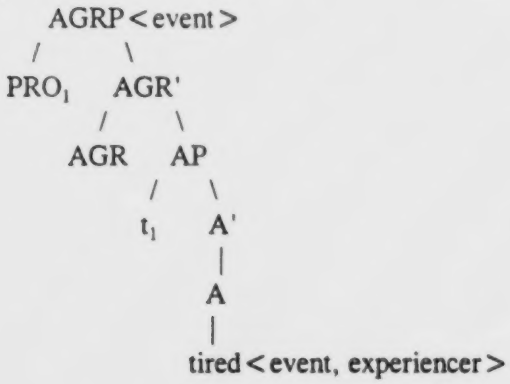
The problem of (26a,c) is the extraction of this predicate head out of the AGRP in (27). As can be seen from the ungrammaticality of the following examples, the AGRP in (27) has an adjunct status:

(28)a. *Who was Mary tired angry at?
b. *What did you swim happy about?

Then, this AGRP is a barrier for the extraction of the AP head *left-handed* out of this maximal projection, which necessarily results in an ECP violation. Thus, an individual-level predicate cannot appear as an adjunct secondary predicate. Thus, examples like (26a,c) are ungrammatical.

Let us now turn to (26b,d). The structure of the stage-level secondary predicate *tired* of these examples is as follows:

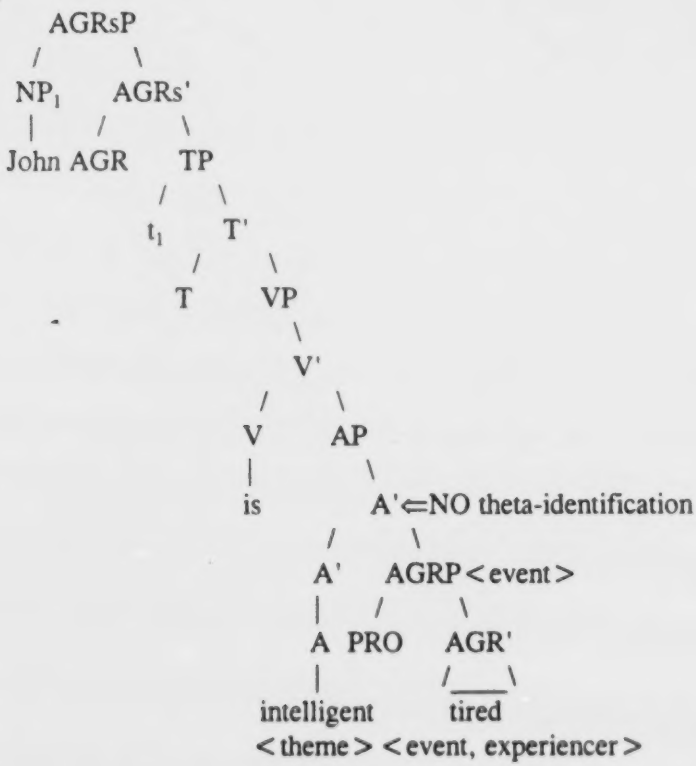
(29)



Since the experiencer theta-role is not the most external theta-role, it can be assigned to PRO within the AGRP without the AP head *tired* being associated with tense. In

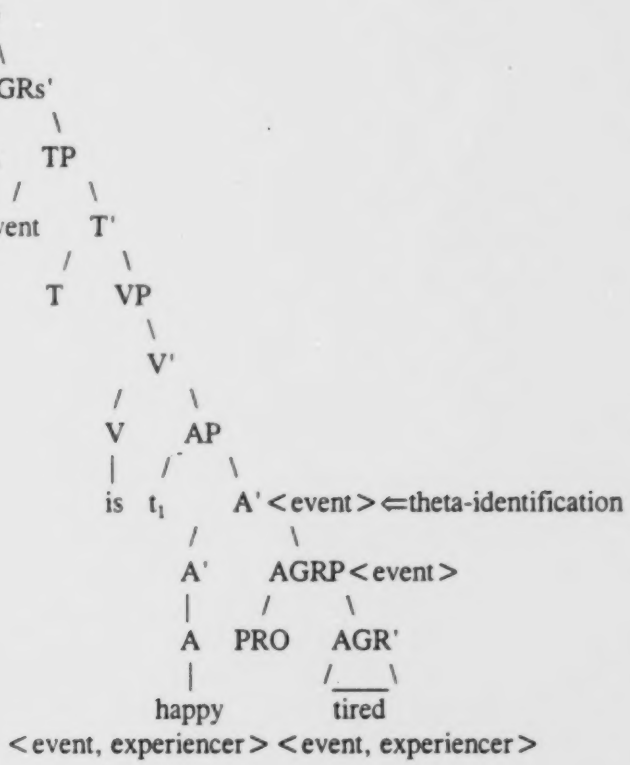
contrast, the event theta-role of this secondary predicate, which is the most external theta-role, cannot be assigned within the AGRP. This theta-role has to be assigned via theta-identification to the event argument in the matrix clause. However, under Kratzer's event argument hypothesis, individual-level predicates lack an event theta-role, hence, in (26b), which has the structure given in (30), theta-identification of the event theta-role of the secondary predicate *tired* is not possible. Thus, this event theta-role fails to be assigned, which results in a Theta-Criterion violation.[8]

(30)



In contrast, in (26d), since the main predicate is stage-level, it has an event theta-role with which the event theta-role of the secondary predicate can be theta-identified. This is illustrated in (31):

(31)



This merged event theta-role is assigned to the event argument in the matrix TP. Thus, there is no Theta-Criterion violation in this example.

Given this analysis of adjunct secondary predicates, I will deal with the intransitive resultative construction in the next section.

The Intransitive Resultative Construction

The argument status of secondary predicates: C&R (1992) argue that the argument structures of the verbs in the transitive and intransitive resultative constructions are as in (32a,b) respectively:

(32)a. Transitive Verb <Agent, Theme, Resulting State>
b. Intransitive Verb <Agent, Resulting State>

The difference between the two resultative constructions is that the transitive resultative construction contains a theme argument, whereas the intransitive resultative construction lacks this argument:

As evidence for the argument status of secondary predicates, C&R (1992) show that the behavior of these secondary predicates is parallel to that of arguments. Consider the following examples:

(33)a. ?How flat do you wonder whether they hammered the metal?
(McNulty, 1988)
b. ?How shiny do you wonder which gems to polish?

(34)a. ?How threadbare do you wonder whether they should run their sneakers?
b. ?How hoarse do you wonder whether they sang themselves?

All of the examples involve extraction of a WH-phrase out of a WH-island. It is important to observe that although extraction of the secondary predicates in these examples is marginal, as shown in (33a,b) and (34a,b), these examples are not as ungrammatical as typical ECP violations. This indicates that the trace left in the original position by movement of the secondary predicate is theta-marked. C&R argue that it is theta-marked by the main predicate, and take these examples as evidence for the argument status of the secondary predicates.

Given the analysis of adjunct secondary predicates presented in the previous section, the event argument must be added to (32a,b), as in (35a,b):

(35)a. Transitive Verb <Event, Agent, Theme, Resulting State>
b. Intransitive Verb <Event, Agent, Resulting State>

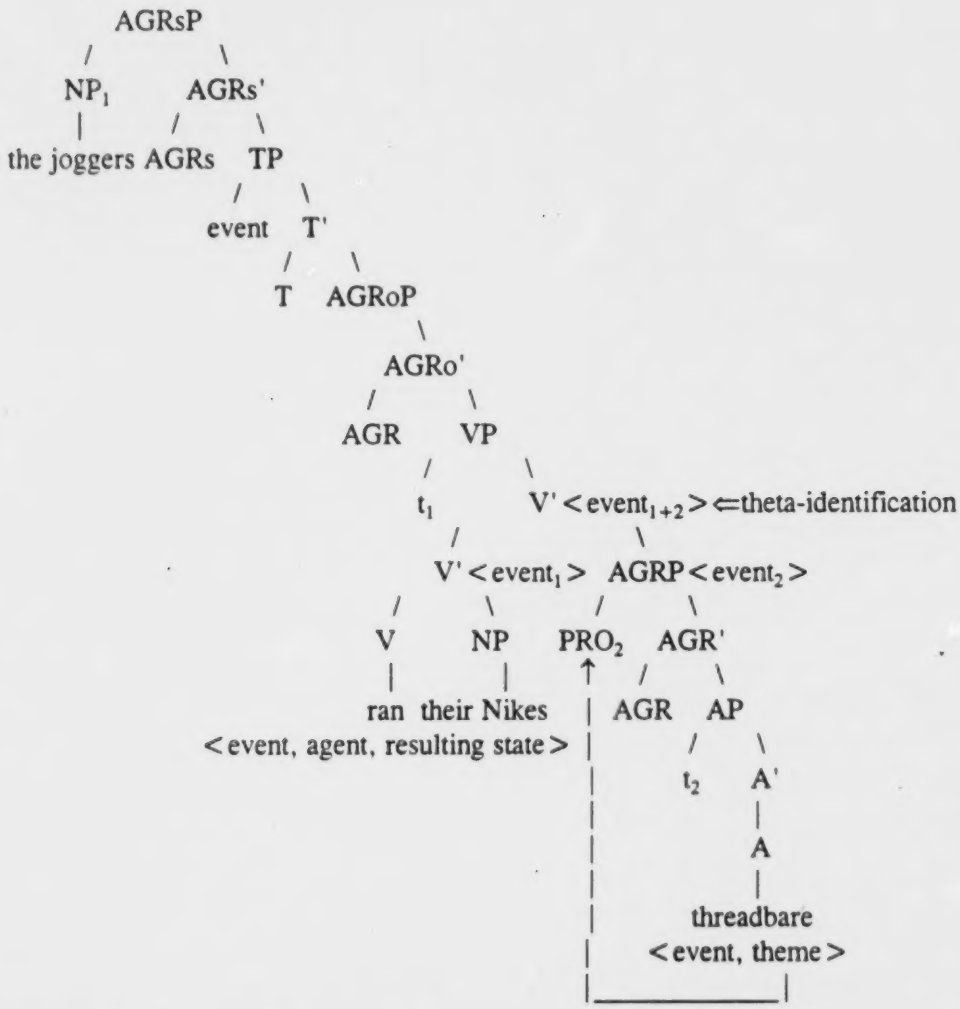
An analysis of the intransitive resultative construction: I now examine the intransitive resultative construction, exemplified in (1a,b), repeated here as (36a,b):

(36)a. The joggers ran their Nikes threadbare.
b. He sneezed the handkerchief soggy.

(36a) can only mean that the joggers ran, and as a result of this running, their Nikes became threadbare. (36b) is used to describe a situation in which he sneezed, and as a result of this sneezing, his handkerchief became soggy.

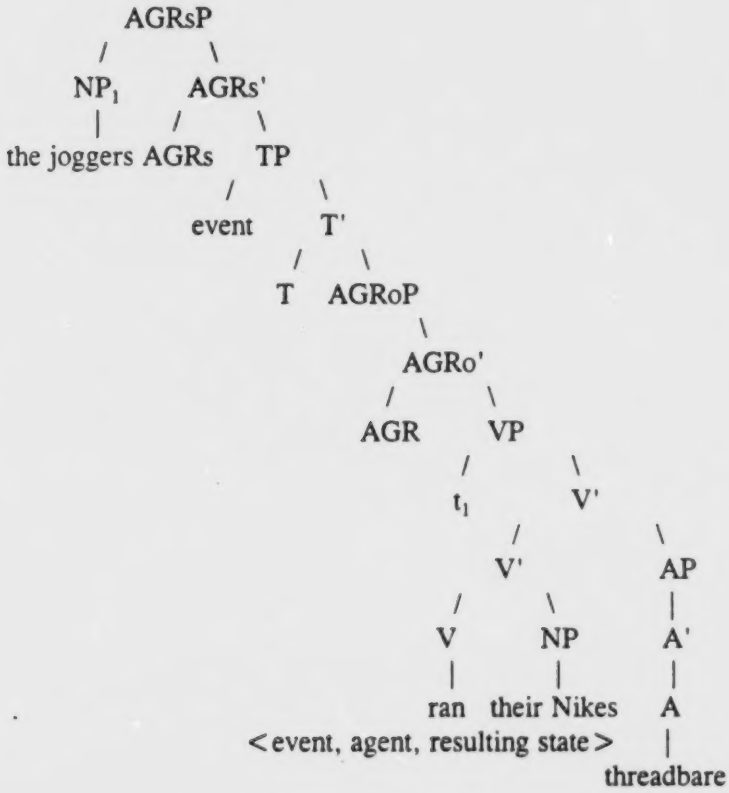
Recall the restriction on the resultative construction which requires the main predicate to have a direct object. Given this peculiar restriction, the postverbal NP must be located within the main predicate. I propose further that verbs which can head intransitive resultatives can select either a bare predicate phrase such as AP and PP or AGRP as secondary predicates. If AGRP is selected for the resultative secondary predicate, the structure of (36a), for example, is as follows:

(37)



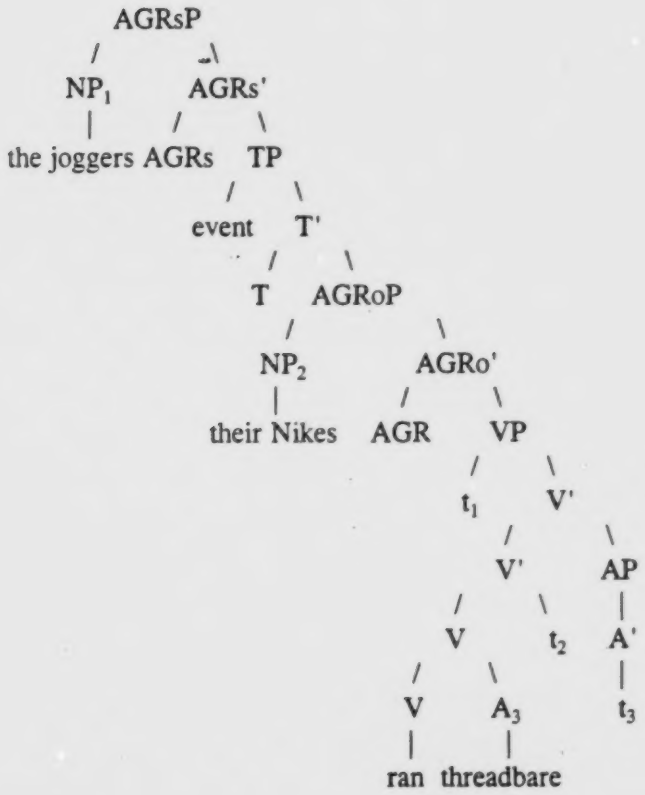
In this structure, the theme theta-role of the secondary predicate is assigned to PRO within the AGRP, and the event theta-role is theta-identified with that of the main predicate. The problem is, however, that there is no theta-role assigned to the postverbal NP *their Nikes*. Hence, the Theta-Criterion is violated. Thus, this structure is not available to (36a).[9] Then, the structure of this example must be as follows:

(38)



Let me concentrate on the theme theta-role of the secondary predicate. Recall that theta-identification is assumed to be restricted to event theta-roles. Thus, this theta-role cannot be assigned via theta-identification. Then, the head of the secondary predicate must be raised to the main predicate in order to assign this theta-role in LF. Since the AP is an argument of the main predicate in this example, the raising of the head of this secondary predicate is permitted. This raising operation is illustrated in (39):

(39)



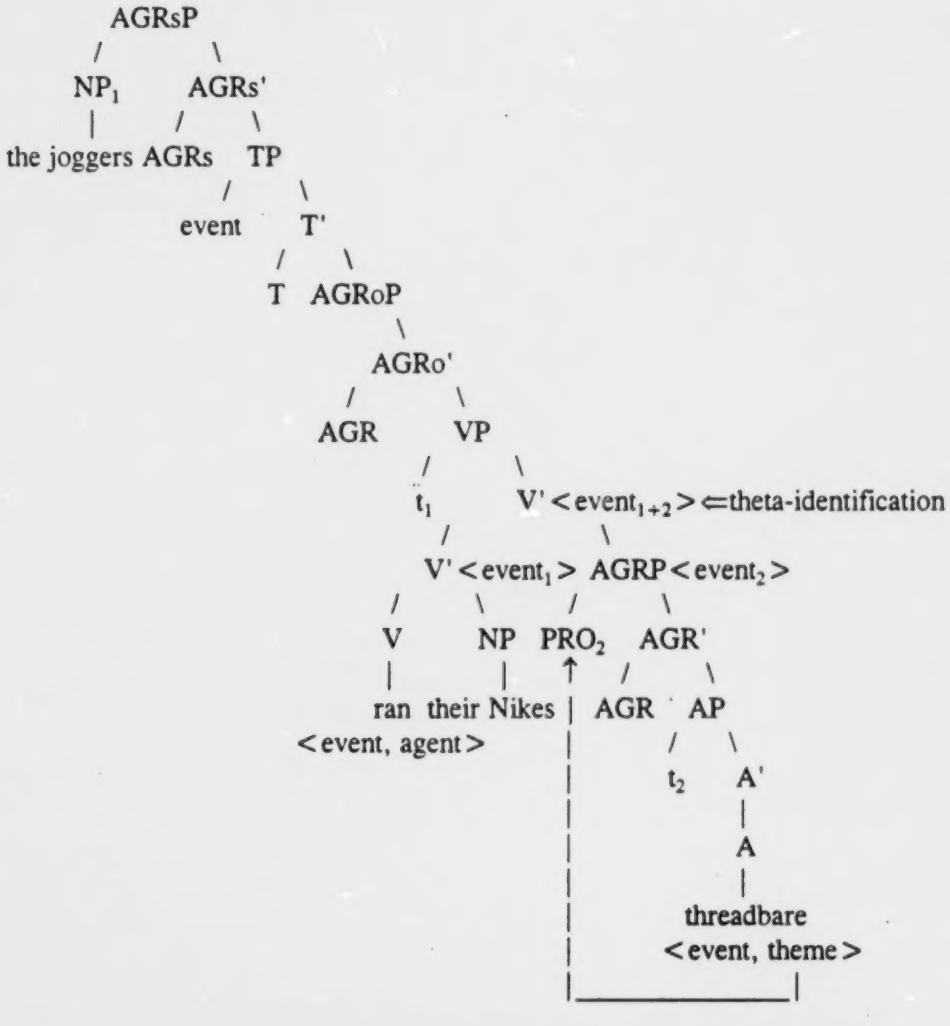
By this incorporation of the head of the secondary predicate to the matrix predicate, the theme theta-role of the secondary predicate is added to the argument structure of the main predicate. The event theta-role of the secondary predicate is theta-identified with that of the main predicate, and thus, this theta-role of the secondary predicate does not change the argument structure of the main predicate. As a result, this complex predicate consisting of the main predicate and the secondary predicate has the event, the agent, the theme and the resulting state theta-roles to assign. Then, the postverbal NP can be assigned this theme theta-role from this complex predicate in LF. The intransitive resultative construction is thus an instance where raising of a predicate is forced for thematic reasons.

4 Answers to the Two Questions

Why is only Resultative Interpretation allowed? The present analysis provides an account for why (36a,b) allow only the resultative interpretation. Recall that on the depictive interpretation, a secondary predicate is not selected by the main predicate. Hence, it is an adjunct. The head of the secondary predicate thus cannot be incorporated into the head of the main predicate in order to assign its theta-roles because of the ECP. Then,

the only possibility would be that the secondary predicate is AGRP whose SPEC is occupied by PRO. The structure of (36a) would thus be as follows:

(40)



In this structure, the theme theta-role of the secondary predicate is assigned to PRO within AGRP, and the event theta-role is theta-identified with that of the main predicate. The problem is that there are no theta-roles available to the NP *their Nikes*. Hence, this violates the Theta-Criterion, and (40) is not available, either. The present analysis thus leads to the conclusion that no structures which allow the depictive interpretation is available for (36a). Although I do not discuss (36b), the unavailability of the depictive interpretation in this example also receives the same account.

Why does the Postverbal NP behave as an Argument? The present analysis also makes the following prediction. Although the postverbal NP is not an argument before the secondary predicate adjoins to the main predicate, namely before LF, it establishes the argument status after this operation, that is, in LF. We have seen in Section 2 that the postverbal NP in this construction does not behave as an argument. However, it should be realized that all the operations mentioned there are those applying in the lexicon and in overt syntax before LF. Hence, the present analysis (correctly) predicts the asymmetry between the transitive and the intransitive resultative constructions. Only the postverbal NP of the former construction behaves as an argument of the main predicate in these respects. On the other hand, if there is a principle/condition which cares about the status of the postverbal NPs in LF, the postverbal NP in the above two resultative constructions should behave the same. That is, they should behave as an argument. Extraction of the postverbal NP may be such a case. Let us repeat the relevant examples:

(41)a. ?Which metal do you wonder who hammered flat?
b. ?Which metal do you wonder whether to hammer flat?

(42)a. ?Which sneakers do you wonder who ran threadbare?
b. ?Which sneakers do you wonder whether to run threadbare?

Considering the marginality of these examples, we can conclude that there is no ECP violation involved. Rather, the marginality of these examples results from Subjacency, due to the WH-island. Then, the original trace, t_1, left behind by movement of the postverbal NP in (43) and (44), must be lexically governed:

(43) $[_{CP}WH_1 \ldots [_{VP}t_1" [_{VP} \ldots [_{CP}WH_2 [_{AGRP} t_1' [_{AGRP} t_2 [_{TP} \ldots [_{VP} \ldots t_1 \ldots]]]]]]]]$

(44) $[_{CP}WH_1 \ldots [_{VP}t_1" [_{VP} \ldots [_{CP}$ whether $[_{AGRP} t_1' [_{AGRP} [_{TP} \ldots [_{VP} \ldots t_1 \ldots]]]]]]]]$

As for (41a,b), this is clear, because the postverbal NP is an argument of the main predicate. However, the grammatical status of (42a,b) is surprising, given that (35b), repeated here as (45), is the argument structure of the main predicates of these examples:

(45) Intransitive Verb <Event, Agent, Resulting State>

In order to account for the grammatical status of (42a,b), C&R (1992) follow Rizzi (1982) and Lasnik and Saito (1984) in that theta-marking is not required for lexical government. The definition of lexical government proposed in Lasnik and Saito (1984) is given below:

(46) α lexically governs β if
a. α governs β,
b. α is a lexical category X^0 (X = [± N, ± V]), and
c. α assigns Case or a theta-role to β.

Given (46), because the postverbal NP may be assigned Case by the main predicate, it is lexically governed by the main predicate, despite of the fact that it is not an argument of the main predicate. However, Chomsky (1986a) attempts to eliminate Case-marking, thus the disjunction, from (46c). Given that Chomsky is correct, the argument status of the postverbal NP of the intransitive resultative construction becomes problematic. Under the analysis presented in this section, the argument/adjunct status of the postverbal NP is changed in the course of the derivation. The postverbal NP is theta-marked by the complex predicate created by head-movement of the secondary predicate to the main predicate in LF. Thus, it is properly governed at this level, where the ECP applies. Therefore, the ECP is not violated. The analysis entertained here then provides a solution to the apparent problem posed by the intransitive resultative construction for Chomsky's (1986a) definition of lexical government.

This analysis is also consistent with Chomsky's (1991) proposal in which lexical government is eliminated. He states that chains in (47a-c), but not the one in (48), are allowed in LF:

(47)a. A...A...A (uniform A-chain)
b. A'...A'...A' (uniform A'-chain)
c. A'...A (operator-variable chain)

(48) *A'...A'...A

Chomsky also suggests that deletion of an intermediate trace can apply only when it is necessary to create a ligitimate chain. In (41a,b), since the chain is (48), intermediate traces must be deleted. Hence, no ECP violation results. On the other hand, in (42a,b), prior to LF, the chain created by movement of the postverbal NP is presumably (47b), which is a legitimate chain. Then, no intermediate traces are required to be deleted. It is in LF that this chain is (48), and thus, deletion of the intermediate traces must apply. Therefore, no ECP violation occurs in (42a,b), and the marginality of these examples are correctly predicted.

5 Op-Movement in the Intransitive Resultative Construction

This section deals with Op-movement in the intransitive resultative construction. Let us start with (49a,b):

(49)a. ??Which wire did Jan twist strands of t straight?
b. ??Which shoes did Jan run the soles of t thin?

(Roberts, 1988)

The marginality of these examples indicates that extraction of a WH-phrase out of the postverbal NP in overt syntax is not allowed. This is not surprising under my analysis. This is because in overt syntax, the postverbal NP has not received an argument status yet, and thus, Subjacency effects should be observed in these examples. Then, consider (50a-d):

(50)a. the wire (that) Jan twisted strands of straight
b. the shoes (that) Jan ran the soles of thin
c. the Nikes (that) I ran the soles of threadbare/ragged (C&R, 1992)
d. the film (that) the producer talked the cast of to death (C&R, 1992)

In these examples, if Op were extracted out of the postverbal NP in overt syntax, these examples should also have the same grammatical status as (49a,b) above. Therefore, I conclude that Op moves in LF in (50a-d). This further indicates that predication relationship must be established by LF (contra Williams, 1980). This is, of course, a desirable result for the minimalist approach to linguistic theory (Chomsky, 1993, 1995) which attempts to eliminate D-structure and S-structure conditions. Also, this is consistent with the analysis of secondary predicates introduced in Section 3 in which predication relationship is established through theta-identification or raising to tense, by LF.

Secondly, to the extent that the above conclusion is correct that Op-movement can take place in LF, Op-movement must take place in LF under the principle of economy (Chomsky, 1991, 1995). Then, the marginality of examples like the following suggests that Subjacency effects are also observed in LF.

(51) ??The man (that) John heard the rumor that Mary met

Whether or not Subjacency Condition applies in LF as well as in overt syntax has been discussed extensively in the literature (e.g., Huang 1982, Nishigauchi 1986, Choe 1987). However, under the minimalist appearch to linguistic theory (Chomsky, 1993, 1995; Chomsky and Lasnik 1993), this is no longer an issue. Chomsky and Lasnik (1993) state that "an expression is a subjacency violation if its derivation forms a starred trace. It is an ECP violation, if, furthermore, this starred trace remains at LF". In (51), its derivation creates a starred trace because of the complex NP island, but it can be erased for the purpose of the ECP. Therefore, under this view, the marginality of this example is naturally expected. Therefore, examples like (51) can be taken as evidence for the minimalist approach to linguistic theory put forth in Chomsky 1993, 1995 and Chomsky and Lasnik, 1993.

6 Concluding Remarks

This paper argued that the intransitive resultative construction requires head-movement of the secondary predicate to the main predicate in order to assign the theta-role to the postverbal NP in LF. Then, this construction is taken as an instance in which theta-role assignment is derivational. This supports Bowers, 1993; Chomsky, 1993, 1995; Larson, 1988, among others. More specifically, the analysis presented in this paper leads to the conclusion that D-structure and S-structure, if they exist, do not play any crucial role with respect to theta-role assignment and the Projection Principle, cannot be maintained as stated in Chomsky, 1981. What is required is that all theta-relations must be established by LF.

NOTES

[1] In addition, it has been known (Simpson, 1986, Hoekstra, 1988, 1992, among others) that not all transitive verbs can have a resultative OSP. Witness the following contrast:

(i)a. John painted the house red.
b. *I saw the hero stiff.

(Simpson, 1986)

Simpson argues that only verbs that necessarily entail some effects on, or contact with, their objects, can head transitive resultatives. Verbs like *paint* entail some effects regarding a color on the house, and the resultative interpretation is available in (ia). Verbs like *see*, on the other hand, do not necessarily entail an effect on their objects. Thus, (ib) is ungrammatical.

There is still a further restriction on verbs that can head resultatives. Consider the following examples from Rapoport (1993):

(ii)a. *I lit the match smoky.
b. *I hit three people upset.

The verbs in (ii) are classified as achievement verbs in Vendler's (1967) sense. Hoekstra (1988, 1992) and Rapoport (1993) argue that only process or activity verbs can appear in resultative constructions, whether transitive or intransitive.

[2] This section is based on Miyamoto, 1994.

[3] See Carlson (1977) for much discussion on stage-level/individual-level distinction of predicates.

[4] See also Davidson (1967) for discussion on the event argument.

[5] Since the raising of the object NP to AGRoP SPEC is not crucial to make a point, I do not illustrate this movement.

[6] See Rapoport (1991) for much discussion on the stage/individual-level distinction of predicates observed in sentences containing an adjunct secondary predicate. See also Speas (1990) for some relevant discussion on this issue.

[7] Raising of the copula to tense may be sufficient for the main predicates in (26) to assign the most external theta-role. Because the choice between these two possibilities does not affect the point I am making here, I tentatively assume that the main predicates in (26) are raised to tense.

[8] In order to avoid unnecessary complications, I omit AGRoP and do not illustrate V-movement in (30) and (31).

[9] An anonymous reviewer has pointed out another possibility that *their Nikes* is base-generated as the subject of *threadbare*, and then, it is raised to the object position of the main predicate via AGRP SPEC, in order to satisfy the restriction on the resultative construction which requires the main predicate to have a direct object.

Under the present assumptions, however, this possibility is not tenable because of the c-command condition/the proper binding condition (Fiengo 1977) which requires the head of a chain to c-command its tail. In (37) and (38), the intermediate trace in AGRP SPEC/AP SPEC cannot be c-commanded by *their Nikes* in the object position of the main predicate. Therefore, I will not pursue this possiblity further.

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MULTIPLE SUBJECT CONSTRUCTIONS IN KOREAN:
A Functional Explanation

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Abstract: This paper investigates the distribution and the nature of the so-called multiple subject constructions in Korean from the perspective of the functional syntax (Kuno (1987)). The major proposal of this paper is that multiple subjectivization is possible only when the first NP of the multiple subjects is characterized by the rest of the clause. I will provide evidence from the analysis of various multiple subject constructions including idiomatic expressions in this language.

1. Introduction

The purpose of this paper is to re-examine the Multiple Subject Constructions (MSCs) in Korean, exemplified by (1) below, and to propose a functional analysis of them.

(1) Chelswu-ka kho-ka khu-ta.
Chelswu-Nom nose-Nom big-Dec
'Chelswu has a big nose.'

The main argument of this paper is that MSCs are possible only when the first NP of the multiple subjects is characterized by the remaining clause. This argument may follow from a more general discourse rule which states that an element in the list-initial position must be characterized by the rest of the string (cf. Kuno (1993 Fall, Class lecture)). In section 2, I will discuss in more detail the characterizational property of MSCs. In section 3, I

will discuss some constructions which seem to be MSCs but actually are not. In section 4, I will try to explain why some cases of honorification in Korean seem to be triggered by the topic (or theme) of the sentence, and not by the subject of the sentence, contrary to the widely accepted assumption that only the subject can trigger the honorification agreement (see Shibatani (1977)). Section 5 concludes this paper.

2. Characterizational Property of MSCs

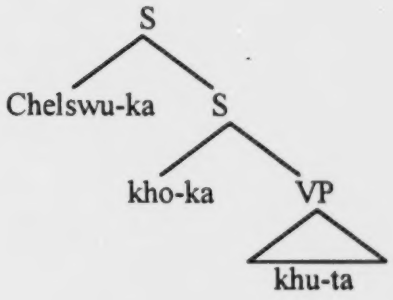
2.1 Inalienable Possession MSCs: To begin with, consider the following examples of inalienable possession MSCs:

(2) a. Chelswu-ka tali-ka ccalp-ta.
Chelswu-Nom leg-Nom short-Dec
'Chelswu's legs are short.'

b. Youngswu-ka meli-ka khu-ta.
Youngswu-Nom head-Nom big-Dec
'Youngswu's head is big.'

In sentences in (2), the relationship between the two nominative NPs is that of 'body-part', thereby being inalienable. It seems to be natural that the leftmost nominative NPs be characterized by the remaining clause in these cases. For example, *Chelswu* in (2a) is characterized as a person whose legs are short, and *Youngswu* in (2b) is characterized as a person who has a big head. Noting this fact, Nam and Ko (1985) argue that there are more than one subject-predicate relationship in these structures, as shown in the following structure.

(3)



According to them, the lower S is a predication of the higher subject *chelswu* and VP is a predication of the lower subject *kho*. This line of reasoning is reminiscent of Choe's (1928) claim that the upper NP in (3) is a 'big-subject' and the lower NP a 'small-subject'. If the term 'subject' is meant to be a syntactic one in their proposal, the following examples whose meaning is not drastically changed from that of (3) may remain unaccounted for in their analysis.

(4) Chelswu-nun kho-ka khu-ta.
Chelswu-Top nose-Nom big-Dec
'As for Chelswu, his nose is big.'

Regardless of whether this sentence is derived from (3) or base-generated, *Chelswu* in (4) is not a subject, but a topic. Therefore, there is simply no subject-predicate relationship in (4) any more. However, if we recall the very meaning of the term *topic* (i.e. something which is talked about), it becomes apparent that Chelswu is characterized by the remaining clause.

2.2 Family Member MSCs: Next, I would like to examine another type of MSCs where the relationship between the two subject NPs is that of family members. Consider the examples in (5) below:

(5) a. Chelswu-ka emenim-i tolaka-si-ess-ta.
Chelswu-Nom mother-Nom die-Hon-Pst-Dec
'Chelswu's mother died.'

b. Youngswu-ka nwuna-ka yeppu-ta.
Youngswu-Nom elder sister-Nom beautiful-Dec
'Youngswu's elder sister is beautiful.'

In the sentences in (5), the first nominative (subject) NPs are also characterized by the remaining clause of each sentence, although not as strongly as in the case of body-part relationships. It may be the case that what happens to the close family members such as a mother and an elder sister or the properties of them can say much about the person involved directly or indirectly. If we compare the sentences in (5) with those in (6) and (7), what I intend to show will become more apparent.

(6) a. Chelswu-uy kay-ka cwukessta.
Chelswu-Gen dog-Nom die-Pst-Dec
'Chelswu's dog died.'
b. ??/*Chelswu-ka kay-ka cwukessta.

(7) a. Youngswu-uy etten chinkwu-ka cwukessta.
Youngswu-Gen a certain friend-Nom die-Pst-Dec
'A certain friend of Youngswu died.'
b. ??/*Youngswu-ka etten chinkwu-ka cwukessta.

Sentences where there is a single subject with a genitive NP like (6a) and (7a) are grammatical. Yet, the corresponding multiple subject constructions given in (6b) and (7b) are not acceptable. Why is it so? Pets (such as dogs) and friends may have a different degree of significance/intimacy with a person who has them, and thereby should be dealt with differently regarding our discussion. However, it is apparent that the fact that someone's dog died does not say much about the owner of the dog as the death of his/her mother does about him/her. Likewise, the fact that a certain friend of his/her died does not seem to say much about him/her, not to mention characterizing him/her. If we change (7b) slightly, the grammaticality is much improved, as we see in (8).

(8) a. Youngswu-uy kacang chinhan chinkwu-ka cwukessta.
Youngswu-Gen most intimate friend-Nom die-Pst-Dec
'Youngswu's closest friend died.'
b. ?/??Youngswu-ka kacang chinhan chinkwu-ka cwukessta.

The gramaticality of (8b) is fluctuating. Although some people (including myself) don't like (8b), the sentence is surely much better than (7b). However, family membership does not seem to guarantee the acceptability of MSCs. Consider the following examples.

(9) a. *Chelswu-ka tongsayng-i wulko-issta.
Chelswu-Nom younger brother-Nom crying-is-Dec
'Chelswu's younger brother is crying.'
b. *Youngswu-ka nwuna-ka kongpwuhako-iss-ta.
Youngswu-Nom elder sister-Nom studying is-Dec
'Youngswu's elder sister is studying.'

Here, *tongsayng* 'younger brother' or *nwuna* 'elder sister' are family members, thereby have a close/intimate relationship with the person involved. However, the leftmost nominative NPs of (9a,b) are not characterized by the remaining clauses, since just one occurrence of events can not characterize the person involved. In other words, in (9a), Chelswu's younger brother's crying does not say much about Chelswu, because this happening is fleeting. Likewise, in (9b), Youngswu's elder sister's studying does not say much about Youngswu. This is of course different from (8b), repeated here as (10).

(10) Youngswu-ka nwuna-ka yeppu-ta.
Youngswu-Nom elder-sister-Nom beautiful-Dec
'Youngswu's elder sister is beautiful.'

In (10), the fact that Youngswu's elder sister is beautiful surely affect Youngswu much, differently from, say, one occurrence of Youngswu's elder sister's studying. For example, the former may be something which

Youngswu may take pride in, and therefore, it can say something about Youngswu directly or indirectly. This is reminiscent of Kuno's (1987) Characterizational Property of Passive Sentences with Inanimate Subjects which states that passive sentences with inanimate subjects and human *by*-agentives are acceptable to the extent that they can be interpreted as sentences that define or characterize the subjects. Consider the following.

(11) a. ??Hamlet was read by John.
b. Hamlet was read even by John.
c. Hamlet was read by millions of millions of people.
d. Hamlet was written by Shakespeare.

Sentences in (11) are passives with inanimate subjects and human *by*-agentives. Therefore, these are subject to Kuno's Passive Rule, roughly stated in the above. (11a) says that *Hamlet* was read by a person named John, presumably once. This one occurrence of event, however, does not characterize the novel *Hamlet*. If we insert the focus element *even* as in (11b), *Hamlet* can be characterized as a book which is read even by a rare reader like *John*. The fact that millions of millions of people read Hamlet tells what kind of a novel *Hamlet* is: it is a very popular novel. Finally if we recall that one of the best ways to describe a novel is to tell who the author is, it becomes clear that (11d) is a typical case of characterization.

2.3 Alienable Possession MSCs: Now, let us move on to the following sort of examples in which the two nominative marked NPs are arguably alienable:

(12) a. *Chelswu-ka kabang-i mwukep-ta.
Chelswu-Nom briefcase-Nom heavy-Dec
'Chelswu's briefcase is heavy.'
b. Chelswu-uy kabang-i mwukep-ta.
Chelswu-Gen

(13) a. Chelswu-ka chayk-i manh-ta
Chelswu-Nom book-Nom many-Dec
'Chelswu has many books.'
b. Chelswu-uy chayk-i manhta.
Chelswu-Gen

While (12b) is grammatical, (12a), which is presumably derived from the grammatical sentence (12b), is not acceptable. This contrasts with the seemingly identical (13a). That is, the relationships between two subject NPs of both cases are alienable one. Nevertheless, one is acceptable, while the other is not. If so, why is (12a) not acceptable, while (13a) is acceptable? Again, the characterizational property of MSCs may account for this contrast. The fact that Chelswu's briefcase is heavy does not say anything about Chelswu, hence being unacceptable. On the other hand, the fact that Chelswu has many books describes what kind of man Chelswu is: he may be an enthusiastic reader, or may be a book-collector. Hence (13b) is acceptable. Consider, further, the following example.

(14) a. I hakkyo-ka kyocang sensayngnim-i tolaka-si-ess-ta.
this school-Nom headmaster-Nom die-Hon-Pst-Dec
The headmaster of this school died.'
b. I hakkyo-uy kyocang sensayngnim-i tolaka-si-ess-ta.
hakkyo-Gen
(15) a. ??I hakkyo-ka haksayng hana-ka cwukess-ta.
this school-Nom student one-Nom die-Pst-Dec
'One of the students of this school died.'
b. I hakkyo-uy haksayng hana-ka cwukessta.
hakkyo-Gen

The sentence (14a) is more natural than (15a), although the syntactic structures of them are identical. My functional explanation is as follows. Usually, there is one headmaster per a school. Therefore, the fact that the headmaster of a specific school died tells what the school is in the state of. However, a student's death does not seem to characterize the school.

2.4 Idiomatic Expressions: Lastly, there are some idiomatic expressions involving body-parts. Consider the following table.

Table 1

expression	idiomatic meaning	literal meaning
pali-nelpta	'has wide contacts'	'foot is wide'
son-i khuta	'is lavish/ generous'	'hand is big'
meli-ka cohta	'is intelligent'	'head is beautiful'

These expressions can occur in MSCs, as shown in (16-18) below.

(16) a. Chelswu-ka pal-i nelp-ta.
Chelswu-Nom foot-Nom wide-Dec
'Chelswu has wide contacts.'

b. *Chelswu-uy pal-i nelp-ta.
Chelswu-Gen

(17) a. Youngswu-ka son-i khu-ta.
Youngswu-Nom hand-Nom big-Dec
'Youngswu is very lavish.'

b. *Youngswu-uy son-i khu-ta.
Youngswu-Gen

(18) a. Hyenswu-ka meli-ka coh-ta.
Hyenswu-Nom head-Nom good-Dec
'Hyenswu is intelligent.'

b. *Hyenswu-uy meli-ka coh-ta.
Hyenswu-Gen

The interpretation of sentential idioms may provide additional arguments for the characterizational property of MSCs. Since the relationship between

the referent of the first subject NP and that of the second NP is one of the inalienable possession, the a-sentences in (16-18) would be derived from the b-sentences, respectively, according to the proponents of movement theory. Yet, the b-sentences do not have such idiomatic meaning as in the a-sentences, and therefore we cannot derive the a- sentences from the b-sentences, respectively. Moreover, the first subject NPs in the a-sentences are characterized by the remaining sentential idiomatic expression in each of the examples.

3. Non-MSCs

In this section, we will discuss some constructions which look like MSCs but in fact are not. To begin with, not every element marked with *-i/-ka* is a subject. Consider the following Japanese and Korean examples.

(19) a. Taroo-ga tenisu-ga zyoozu-da. (Japanese)
Taro-ka tennis-ka sangtangha-ta (Korean)
Taro-Nom tennis-Nom good at-Dec
'Taro is good at tennis.'

b. Taroo-ga sakana-ga suki-da. (Japanese)
Taro-ka mwulkoki-ka coh-ta. (Korean)
Taro-Nom fish-Nom fond of-Dec
'Taro likes fish.'

As Kuno (1978, 1980) notes, the second *-ga/-ka* marked elements in (19a,b) are not real subject: they are objects with nominative case marker. In what way they get their case assigned is not relevant to our present discussion. Consider, further, the following double nominative NP constructions.

(20) a. Ecye pwute-ka nalssi-ka coha-cyess-ta.
yesterday from-Nom weather-Nom good-become-Pst-Dec
'The weather became good from yesterday.'

b. Seoul-eyse-ka salki-ka coh-ta.
Seoul-in-Nom living-Nom good-Dec
'Seoul is good to live in.'

c. I kongcang-i pwul-i na-ss-ta.
this factory-Nom fire-Nom break out-Pst-Dec
'Fire broke out in this factory.'

In all the above sentences, it is not likely that the PPs "from yesterday", "in Seoul", "in this factory" are subjects. The first *-ka* marked elements get interpreted as focus or exhaustive listing. Therefore, these cases are not under our discussion. Although these examples, with those in (19), are not real multiple subject constructions, it can be said about these constructions that the first nominative NPs are characterized by the rest of the string.

Let us consider another type of MSCs.

(21) Kim sacangnim-i pise-ka cohu-si-ta.
Kim president-Nom secretary-Nom good is-Hon-Dec
'(i) President Kim likes his secretary.' (Non-MSC)
'(ii) President Kim's secretary is nice.' (MSC)

Sentence (21) is ambiguous in two ways. In one interpretation (that is, in Non-MSC interpretation), the second nominative NP *pise* is not a subject, but an object just like that in (19b). In the other interpretation (i.e., in MSC interpretation), both the nominative NPs are real subjects, as we have discussed until now. In this case, we may have the following single subject construction.

(21ii)' Kim sacangnim-uy pise-ka cohu-si-ta.
Kim president-Gen secretary-Nom nice is-Hon-Dec
'President Kim's secretary is nice.'

Only in this sense is the sentence (21) a multiple subject construction. And in this case, the first subject is characterized by the remaining S. Of course, this does not exclude the possibility of the subject of a sentence being char-

acterized by VP in single subject construction. All that I am claiming here is that one should be careful to distinguish what is the real case of MSCs from what is not. In the next section, I will discuss Korean Honorifics in relation to MSCs.

4. Honorifics and MSCs

Since Shibatani's (1977) influential work, the tests for subjecthood, namely, reflexivization and subject honorification, have often been used indiscriminately as diagnostics for subjecthood in both Japanese and Korean. The tests have been employed in such a manner that anything that can be either the antecedent of reflexives or the target of honorification has been claimed to be a "subject". Let us take a look at Kim and Kuno's (1985, henceforth, K&K) explanation regarding subject honorification.

(22) a. Kim sensayngnim-kkeyse Swuni-ka cohu-si-ta.
Kim teacher-Hon-Nom (Hon) Swuni-Nom like-Hon-Dec
'Teacher Kim likes Swuni.'

b. *Swuni-ka Kim sensayngnim-kkeyse cohu-si-ta.
Swuni-Nom Kim teacher-Nom like-Hon-Dec
'Swuni likes Teacher Kim.'

The fact that (22a) is acceptable while (22b) is not strongly suggests that they are not multiple subject constructions; the first nominative NP behaves like a real subject but the second nominative NP lacks the honorific-triggering characteristic of subjecthood. However, it does not seem to be the case that there is no problem with their explanation. Consider:

(23) a. ??Halapeci-uy saep-i silphayha-si-ess-ta.
grandfather-Gen business-Nom fail-Hon-Pst-Dec
'Grandfather's business failed.'

b. Halapeci-kkeyse saep-i silphayha-si-ess-ta.
grandfather-Nom business-Nom fail-Hon-Pst-Dec
'Grandfather's business failed.'

According to them, the acceptability of (23b) shows that the first nominative NP is a subject. If this is right, how can we decide the subject of the sentences in (16), here repeated as (24)?

(24) a. I hakkyo-ka kyocang sensayngnim-i tolaka-si-ess-ta.
this school-Nom headmaster-Nom die-Hon-Pst-Dec
'The headmaster of this school died.'
b. I hakkyo-uy kyocang sensayngnim-i tolaka-si-essta.
school-Gen

They would explain that in this case, the second nominative NP must be a subject due to the honorific-agreement. However, there is no syntactic difference between (23) and (24), while the subject is different from each other. Another problem with their argument is the fact that many people (including me) do not find (23a) awkward, though not perfect. Many Korean linguists find the similar sentences to (23a) better than what K&K (1985) thought to be. Look at the following examples from Yun (1991).

(25) a. Emenim-kkeyse kenkang-i cohu-si-ta.
mother-Nom (Hon) health-Nom good-Hon-Dec
'Mother's health is good.'
b. Emenim-uy kenkang-i cohu-si-ta.
mother-Gen health-Nom good-Hon-Dec
'Mother's health is good.'

(26) a. Apenim-kkeyse son-i caku-si-ta.
father (Hon)-Nom (Hon) hand-Nom small-Hon-Dec
'Father has small hands.'
b. Apenim-uy son-i caku-si-ta.
father (Hon)-Gen hand-Nom small-Hon-Dec
'Father has small hands.'

Let us consider a pair of such examples from Yoon (1987).

(27) a. ?Kim sacangnim-i kohyang-i me-si-ta.
Kim president-Nom hometown-Nom far-Hon-Dec
'President Kim's hometown is far.'

b. ?Kim sacangnim-uy kohyang-i me-si-ta.
president-Gen
'President Kim's hometown is far.'

(26b) and (27b) are fully acceptable to Yun (1991), and (30b) is quite natural to Yoon (1987), although these sentences have the same syntactic structure as that in (23b), which is K&K's (1985). Whether the grammatical judgment is correct or not is not our concern here. But the question is, why some people regard these sentences acceptable and others unacceptable? The answer to this question may be found in Yoon's (1987) account. He argues "that while the grammar of honorifics is seemingly sensitive to the subject, it is possible to link the "subject honorifics" to categories other than subjects in pragmatically biased contexts" (Yoon (1987) pp.151). Therefore, we cannot say, contra K&K, that one of the two nominative NPs in honorific constructions is a subject and the other is not. There may be indeed two real subjects in honorific constructions (a real case of MSCs) and honorification may occur on the level of pragmatics. When the referent of the first nominative NP, which may coincidentally be a subject, deserves deference, honorification may occur, as in (23b), and (25a, 26a, 27a). When the referent of the genitive NP, which is not a subject, deserves deference, honorification occurs by the whole NP as in (23a) and (24b, 25b, 26b, 27b).

5. Summary

In this paper, I have shown that MSCs is possible only when the first subject is characterized by the rest of the clause in the first two sections. Specifically, I have shown that the so called inalienable possession MSCs always show characterizational property and that family member MSCs and alienable possession MSCs are acceptable when the rest of the clause characterizes the first subject directly or indirectly. In section 3, I tried to distinguish real MSCs from fake MSCs. Finally in section 4, I provided some evidence against honorifics analysis as a subjecthood test proposed by K&K. It is also argued that the fluctuating grammatical judgment seems to be due to the discrepancy between syntactic subjecthood and pragmatics for honorification.

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Constraints on Noun Incorporation in Korean

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Abstract: In this paper I discuss noun incorporation phenomena in Korean. I will show that noun incorporation of Korean occurs at D-structure and obeys the Head Movement Constraint (HMC) by Travis (1984) and Chomsky (1986) syntactically and the Theme-Only Constraint semantically. For the discussion, I will first identify the structure of 'hæ-tot-i' *sunrise*-type words, showing that before derivation through attachment of the nominalizing affix '-i', compounding between 'hæ' *sun* and 'tot' *to rise* should occur in the syntax. This fact will then be used as direct evidence of noun incorporation, which is a word formation process in the syntax. Based on the structure identified, I will show that every noun which goes through noun incorporation in the syntax should have the thematic role of *Theme*. This observation is represented by the Theme-Only Constraint.

0. Introduction

Korean has many words with the structure [N + V_{STEM} + A_N (-i)]. The following are some examples of such words.

(1) a. hæ-tot-i
sun-rise-A_N[1]
'sunrise'

b. mul-pat-i
water-receive-A_N
'(a) gutter'

c. haru-sal-i
a day-live-A_N
'(a) dayfly'

d. kutu-tak-i
shoe-shine-A_N
'shoe-shine boy'

e. koki-cap-i
fish-catch-A_N
'fishing'

f. kamok-sal-i
prison-live-A_N
'living-in-prison'

For convenience's sake, let's call the words in (1) 'hæ-tot-i' *sunrise* type words. Concerning the formation process of such words, there might be two analyses such as [[N+V_{STEM}] + A_N(-i)] and [N+ [V_{STEM}+A_N(-i)]]. In this paper, I will first show which analysis of the two is more plausible and then, based on the confirmed process of word formation of 'hæ-tot-i' *sunrise* type words, I will discuss the main concerns of this paper such as noun incorporation in Korean, and syntactic and semantic constraints which restrict Noun incorporation.

1. Incorporation Structure

As illustrated above, the possible structures for 'hæ-tot-i' *sunrise* type words are as follows:

(2) a. $[[N + V_{STEM}] + A_N(-i)]$

b. $[N + [V_{STEM} + A_N(-i)]]$

(2a) shows that compounding between a noun and a verb occurs before the addition of a nominalizing affix, while in (2b) compounding occurs after derivation. The reason why both structures have been controversially assumed for 'hæ-tot-i' *sunrise* type words is because neither the structure $[N+V_{STEM}]_V$ of 'hæ-tot-i' *sunrise* type words, such as 'hæ-tot', 'mul-pat', 'haru-sal', etc., in (1) nor the structure $[V_{STEM}+A_N(-i)]_N$ of that type of words such as 'tot-i', 'sal-i', 'cap-i', and 'pat-i', etc. is used as an independent word[2] in Modern Korean. For this reason, some have assumed (2a), while others (2b). In this paper, I will argue that the structure in (2a) is correct. In order to approve the structure in (2a), let's consider what problems (2b) has.

The reason some linguists accept the (2b) structure is as follows. First, even though Korean has no compounds with the structure [N+V], or the structure $[V+A_N(-i)]_N$ such as $[sal+-i]_N$, nominals with the structure (2b) are observed more frequently than those with the structure (2a) being used to combine with other nominals in word formation. That is, although word forms such as 'sal-i' *living* and 'cap-i' *capture* are not used as an independent word[3], they frequently can combine with other nouns to form a bigger compound. (3) and (4) show some more examples of this usage.

(3) a. məsɨm-sal-i,
farmhand-live-A_N
'living as a farmhand'

b. kwiyaŋ-sal-i
exile-live-A_N
'living in exile'

c. ok-sal-i
prison-live-A_N
'living in a prison'

d. çəka-sal-i
wife's home-live- A_N
'living in a wife's home'

e. haru-sal-i
a day-live-A_N
'(a) dayfly'

(4) a. mal-cap-i
mal[4]-catch-A_N
'a person who measures grain by *mal*'

b. param-cap-i
wind-catch-A_N
'(a) cheerleader(person)'

c. son-cap-i
hand-catch- A_N
'(a) handle'

d. kal-cap-i
sword-catch-A_N
'(a) swordsman'

Let's consider the characteristics of 'sal-i' *living* and 'cap-i' *catching* in (3) and (4) in more detail.

Lee (1965) analyzes words in (3) and (4) as compound nouns, considering 'sal-i' *living* and 'cap-i' *catching* as nouns. If he is correct, then it means that 'sal-i' *living* and 'cap-i' *catching* are derived nominals produced by addition of the nominalizing affix '-i'. And both of them, 'sal-i' and 'cap-i', should be able to form bigger derivatives or compounds by combining with other nominalizing affixes or nouns or should be able to appear independently such as the examples in (5) and (6). However, the data in (7)-(8) show that this is not the case.

(5) a. $[[mol]_V + [-i]A_N]_N$
chase A_N
'chasing'

b. $[[pul]_V + [-i]A_N]_N$
solve A_N
'solving'

c. $[[nol]_V + [-i]A_N]_N$
play A_N
'playing'

(6) a. $[[mol\text{-}i]_N + [k'un]A_N]_N$[5]
chase-A_N+A_N('person')
'(a) chaser'

b. $[[mol\text{-}i]_N + [pæ]A_N]_N$
chase-A_N+ship
'(a) chasing boat'

c. $[[pul\text{-}i]_N + [ran]_N]_N$
solve-A_N + column
'(an) explanation column'

d. $[[nol\text{-}i]_N + [madaŋ]_N]_N$
play-A_N + field
'(a) playground'

(7) a. *sal-i, *cap-i, *pat-i, *kəl-i,
live-A_N catch-A_N receive-A_N walk-A_N

b. *cu-i, *k'ak-i *pal-i *mil-i
give-A_N cut-A_N sell-A_N push-A_N

(8) a.* $[[sal\text{-}i]_N + [k'un]A_N]_N$
live-A_N + A_N('person')

b.* $[[sal\text{-}i]_N + [pæ]A_N]_N$
live-A_N+ship

c.* $[[cap\text{-}i]_N + [ran]_N]_N$ — catch-A_N + column

d.* $[[cap\text{-}i]_N + [madaŋ]_N]_N$ — catch-A_N + field

Unlike the examples in (5-6), word forms such as 'sal-i' and 'cap-i' can not easily combine with others to form bigger derivatives or compounds, nor can they be used independently as we see in (7-8).

Based on the observations above, we can say that in the 'hæ-tot-i' *sunrise* type words with $[N+V_{STEM}+A_N$ (-i)] structure as we see in (1), (7) and (8), 'tot-i' cannot be said to be a derived nominal. That is, the V_{STEM} and the A_N(-i) don't combine to form a derived nominal in the 'hæ-tot-i' *sunrise* type words.

What would it be to analyze the word type 'tot-i' *to rise* not as a nominal but as an affix? Such an analysis will bring about the following problems. First, there is no case in Korean in which the combination ,`$V_{STEM}$ +$Affix_N$( -i )', becomes an affix. Therefore, though the combination, `V_{STEM} +$Affix_N$(-i)' could be hyper-correctionally considered as an affix, the original structure should be $[[N+V_{STEM}]+A_N$(-i)], which is represented as (2a).

Second, if the word type of 'tot-i' *to rise*, that is, `V_{STEM} +$Affix_N$(-i)', were an affix and were used to show the same distribution in many nominals, then, words which belong to such a word type should be considered to have the same meaning wherever they appear. If we consider the slightest meaning of each of them as they appear in bigger derived nominals in more detail, however, we cannot say that the meaning is the same. Let's take 'sal-i' and 'cap-i' as examples.

(9) a. çəga-sal-i[6] : /sal/ --> 'to live or stay'
wife's home-live-A_N
'living in a wife's home'

b. haru-sal-i : /sal/ --> 'to manage or extend life'
a day-live-A_N
'(a) dayfly'

c. məsum-sal-i : /sal/ --> 'to do a role of a farmhand'
farmhand-live-A_N /-i/ --> 'the action of catching fish'
'living as a farmhand'

(10) a. puk-cap-i : /cap/ --> 'to grasp with hands,
drum-catch-A_N /-i/ --> 'a person who catches (something)'
'(a) drummer'

b. koki-cap-i : /cap/ --> 'to catch or capture'
fish-catch-A_N /-i/ --> 'the action of catching something'
'fishing'

c. son-cap-i : /cap/ --> 'to grasp or catch'
hand-grasp-A_N /-i/ --> 'something grasped by hands'
'(a) handle'

As we see in (9) and (10), 'sal-i' and 'cap-i', which belong to the same word type, are different in their meaning according to the environment which they are in. Therefore, based on the facts we discussed, we cannot deal with them as an affix. Instead, we can explain the difference of meaning when we assume the structure of $[[N+V_{STEM}]+ -i\ ]$.

This analysis can be supported by considering the historical development of the affix $[caŋ\text{-}i]_N$, 'an artisan'.[7] 'caŋ-i' is a diachronically developed affix which has been formed by addition of '-i', an affix indicating 'a person' in this case, to the Chinese word 'caŋ' which represents *an artisan, a craftsman or a person who has an excellent skill or technique in certain areas such as art, handicraft, etc.* The fact that 'caŋ-i' is not an independent word in Modern Korean like 'sal-i' and 'cap-i' and that 'çil-caŋ' has its full meaning even without the affix '-i' indicates that 'çil-caŋ-i' has experienced change of affixation from $[[[çil]_N+[caŋ]_N]_N + [\text{-}i]_{Affix}]_N$ to $[[çil]_N+[[caŋ]_N+[\text{-}i]_{Affix}]_N]_N$.[8]

2. Syntactic Formation of the '[hæ-tot-]' *to sunrise* type compounds

In the previous sections, we discussed that 'hæ-tot-i' *sunrise* type words should be understood to have gone through the formation process of $[[hæ\text{-}tot]_V+[\text{-}i]_{Affix}]_N$. Now, the remaining question will be about the procedure of formation of [hæ-tot-]$_V$ *to sunrise,* that is, to reveal how and where such type of verb compounds is formed.

First of all, I will assume that 'hætot-' *to sunrise* type compounds are not a lexical compound but a syntactic compound. One argument for this point of view is that syntactically corresponding sentential - or IP - structures to the 'hætot-' *to sunrise* type compounds are easily available. Another argument is that syntactic affixes, that is, Case suffixes, can be freely inserted between the two morphemes of such verb compounds. Consider the following comparison;

(11) Compounds Corresponding Sentences

a. [hæ-tot-i]$_N$ <---> [hæ-ka tot-ta]$_{IP}$
sun-rise-A$_N$ sun-NOM rise-DECL
'sunrise' 'The sun rises.'

b. [mul-pat-i]$_N$ <---> [mul-il pat-ta]$_{IP}$
water-receive-A$_N$ water-ACC receive-DECL
'gutter' 'pro receive(s) water.'

c. [kamok-sal-i]$_N$ <---> [kamok-il sal-ta]$_{IP}$
prison-live-A$_N$ kamok-ACC live-DECL
'living-in-the-prison' 'pro serve(s) a prison term.'

d. [koki-cap-i]$_N$ <---> [koki-rɨl cap-ta]$_{IP}$
fish-catch-A$_N$ fish-ACC catch-DECL
'fishing' 'pro catch(es) fish.'

e. [kutu-tak-i]$_N$ <---> [kutu-rɨl tak-ta]$_{IP}$
shoe-shine-A$_N$ shoe-ACC shine-DECL
'(a) shoeshine person' 'pro shine(s) shoes.'

We can observe that 'hætot-' *to sunrise* type compounds can be easily converted into another bigger syntactic structure of IP by inserting some Case suffixes. (11a) shows the relation between Subject - unaccusative verbs and (11b-e) show the relation between Object - transitive verbs.[9] Thus, based on the evidence observed above, we can say that 'hætot-' type compounds are a syntactic compound[10], not a lexical one.

3. Syntactic Constraint of Noun Incorporation

Now, let's consider the main concern of this paper. The facts that in 'hæ-tot-i' *sunrise* type words, the noun 'hæ' *sun* and the verb 'tot' *to rise* should combine with each other before the nominalizing affix '-i' is attached to the verb, and that such compounding can be analyzed as a syntactic process suggest that there might be Noun incorporation processes in Korean which can be explained syntactically.[11] I assume that a noun, head of the preceding NP, moves to the head of the following VP to form a syntactic compound. Mithun (1984) and Baker (1985, 1988) understand this kind of head movement as noun incorporation in which a noun incorporates into a verb. Mithun (1984)'s Noun incorporation can be summarized as follows:

(12) a. A noun stem functioning as Subject combines with an intransitive verb to form a new intransitive verb.

b. A noun stem functioning as Object combines with a transitive verb to form a new intransitive verb.

(12) says that in Noun incorporation in Korean, the preceding noun plays a role of 'stem' morphologically in combining with the following verb, producing a new compound. (12a) results from combining the noun in the Subject position with the following verb, and (12b) is for the case in which the noun in the Object position moves to the following verb. Under the Head-Movement hypothesis based on the noun incorporation of (12), we can have the following structures.

(13) a. $[[[hæ]_N]_{NP}$ $[[tot]_V]_{VP}$ ta[12] ---> $[[[\ t_i\ ]_N]_{NP}$ $[hæ_i+tot]_V]_{VP}$ ta
'sun' 'rise' DECL

b. $[[[mul]_N]_{NP}$ $[pat]_V]_{V'}$ ta ---> $[[[\ ti\ ]_N]_{NP}$ $[mul_i+pat]_V]_{V'}$ ta
'water' 'receive' DECL

c. $[[[kamok]_N]_{NP}$ $[sal]_V]_{V'}$ ta ---> $[[[\ t_i\ ]_N]_{NP}$ $[kamok_i+sal\ ]_V]_{V'}$ ta
'prison' 'live' DECL

d. $[[[koki]_N]_{NP}$ $[cap]_V]_{V'}$ ta ---> $[[[\ t_i\ ]_N]_{NP}$ $[koki_i+cap\ ]_V]_{V'}$ ta
'fish' 'catch' DECL

e. $[[[kutu]_N]_{NP}$ $[tak]_V]_{V'}$ ta ---> $[[[\ t_i\ ]_N]_{NP}$ $[kutu_i+tak]_V]_{V'}$ ta
'shoe' 'shine' DECL

(13a) indicates that 'hæ' *sun* which is the head of an NP in the thematic Subject position[13] under the VP, moves to the immediately following verb, and (13b-e) show that heads of the NP's in the Object position, such as 'mul' *water*, 'kamok' *prison*, 'koki' *fish*, and 'kutu' *shoe* respectively, move to immediately following verbs.

Head-Movement requires adjacency. That is, a noun, head of NP, and a verb, head of VP, should be adjacent to each other in order for the verb to govern its preceding NP-trace. All movements in (13) are licensed: they observe the adjacency condition, that is, all NP-traces are governed by the following verbs.

When a noun moves to an adjacent verb while observing the adjacency condition, let's assume that it produces a left-branching structure. Consider (14);

(14) a. $[[hæ]_N+[tot]_V]_V$

b.

Now, based on the assumptions we have discussed so far, we can show the procedure of head movement for noun incorporation in Korean as follows;

(15) a. Head Movement from Subject Noun to Verb

b Head Movement from Object Noun to Verb

If we accept the Unaccusative Hypothesis, then we can unify (a) structure into (b) structure because in the (a) structure, Subject is actually originated as an internal argument of an Unaccusative verb, that is, a *Theme.*
In the structures of (15), the preceding noun and the following verb are adjacent to each other, and the verb governs the noun. Compare (15) structure with the following (16) structure in which another head intervenes between a noun and a verb.

(16) a. cəlsu-nɨn pab-ɨl mani mək -nɨn -ta.
cəlsu-NOM rice-ACC much eat -Pres. -DECL
'Cəlsu eats rice much.'

b.* cəlsu-nɨn $[_{VP}\ [_{NP}\ t_i\ ]\ [_{V'}\ [_{ADVP}$ mani $]\ \ [pab_i + mək]_V\ ]]$ -nɨn -ta.

(16) shows that when the adjacency condition is violated, noun incorporation in Korean is not allowed. Thus, we can say that the movement of noun incorporation should obey the following Head-Movement Constraint (Chomsky 1986, Travis 1984).

(17) Head Movement Constraint (HMC)

Movement of a zero-level category β is restricted to the position of a head α that governs the maximal projection γ of β, where α θ-governs or L-marks γ if $\alpha \neq C$.

4. Semantic Constraint of Noun Incorporation

In this section, we will discuss a semantic constraint which regulates noun incorporation in Korean. Though we have revealed the procedure of noun incorporation in Korean as syntactic, still some questions remain: first, is head movement for noun incorporation possible in every sentence with the structure of (15)? Second, why does a noun move to a verb, playing a role of a STEM?

The clue to the answers can be obtained from the thematic relation between a verb and its preceding noun. That is, in the noun incorporation structure, a noun is very closely related with one of the possible thematic roles that a verb can have. Consider the following sentences of (18) again. ((18) is a repeat of (13));

(18)[14]a. $[hæ]_{NP}$ $[tot]_{VP}$ -ta ---> $[t_i]_{NP}$ $[hæ_i+tot]_V$ -ta
'sun' 'rise' DECL
Theme

b. $[mul]_{NP}$ $[pat]_V$ -ta ---> $[t_i]_{NP}$ $[mul_i+pat]_V$ -ta
'water' 'receive' DECL
Theme

c. $[kamok]_{NP}$ $[sal]_V$ -ta ---> $[t_i]_{NP}$ $[kamok_i+sal]_V$ -ta
'prison' 'live' DECL
Theme

d. $[koki]_{NP}$ $[cap]_V$ -ta ---> $[t_i]_{NP}$ $[koki_i+cap]_V$ -ta
'fish' 'catch' DECL
Theme

e. $[kutu]_{NP}$ $[tak]_V$ -ta ---> $[t_i]_{NP}$ $[kutu_i+tak]_V$ -ta
'shoe' 'shine' DECL
Theme

All nouns in (18) move- that is, incorporate- into verbs. In this case, all nouns have the thematic role of '*theme*'.

What would it be when nouns have other thematic roles than *Theme*? Consider the following in which nouns have thematic roles other than *Theme*:

(19) a. Tom-i kaki-ka himdɨl -ta
Tom-NOM go-NOM be-difficult -DECL
Agent
'It is difficult for Tom to go.'
a'* [t_i] [[Tom $_i$ +ka]$_V$ +ki]$_N$ -ka himdɨl-ta

b. totɨk-i sunkyəŋ-eke cap -hi -ət -ta
thief-NOM policeman -'by' catch -Passive -Past -DECL
Agent
'A thief was caught by a policeman.'
b'* totɨk-i [t_i] [sunkiəŋ $_i$+cap]$_V$ -hi -ət -ta.

c. Bill-ɨn cip-e itki-rɨl siləhan -ta.
Bill-NOM house-'at' staying-Acc dislike -DECL
Locative
'Bill dislikes staying at home.'
c'*Bill-ɨn [t_i] [[cip$_i$+it]$_V$ +ki]$_N$ -rɨl siləhan -ta.

d. Bill-ɨn cip-e kaki-rɨl siləhan -ta.
Bill-NOM house-'to' going-Acc dislike -DECL
Goal
'Bill dislikes going home.'
d'* Bill-ɨn [t_i] [[cip$_i$+ka]$_V$ +ki]$_N$-rɨl siləhan -ta.

e. nakta-nɨn arabia-esə wa -t -ta.
camel-NOM Arabia -'from' come -Past -DECL
Source
'Camels came from Arabia.'
e' * nakta-nɨn [t_i] [arabia $_i$+wa]$_V$ - t -ta.

f. Mary-nin pam-e on-ta
Mary-NOM night-'in' come -DECL
Time
'Mary comes at night.'
f'.* Mary-nin [t_i] [pam$_i$+on]$_V$ -ta

(20) a. Tom-in Nun-i næri-ki-ril kitæhan-ta
Tom-NOM snow-NOM fall+ing-ACC want -DECL
Theme
'Tom wants snow to fall.'

a'. Tom-in [t_i] [[nun$_i$ +næri]$_V$+ki]$_N$-ril kitæhan-ta.

In (19), thematic roles of adjacent NP's are 'Agent', 'Locative', 'Goal', 'Source' and 'Time' respectively. And none of the heads of NP's in (19) can move to adjacent heads of VP's. Though the structures of (19) are the same as those of (15), and though they obey HMC of (16), movement of nouns to the following verb position results in at best marginal or ungrammatical sentences. On the other hand, in (20), movement of a head of an adjacent NP to the following verb position is allowed as it is in (18). The difference between the (18) and (19) sentences is just from the difference of thematic roles: +*Theme* in (18) and (20), while –*Theme* in (19). Therefore, we can conclude that head movement of a Noun to a Verb in Korean should obey the following semantic constraint:

(21) *Theme*-Only Condition (Semantic Constraint of Noun incorporation in Korean)

N can move into an adjacent V for semantic conjunction iff the θ-role of N, a syntactic head, is a *Theme*.

5. Conclusion

We have discussed the structure of 'hæ-tot-i' type compounds, Noun incorporation in Korean which can be considered as a word formation process in the syntax, and syntactic and semantic constraints regulating noun incorporation. For a syntactic constraint restricting noun incorporation in Korean, I have argued that noun incorporation in Korean must obey the Head Movement Constraint suggested by Chomsky (1986) and Travis (1984). Concerning a semantic constraint for noun incorporation, we have revealed that only nouns with the

thematic role of *Theme* can go through noun incorporation in Korean, which is formally expressed in (18).

NOTES

1. "A_N" indicates the Nominalizing Affix.

2. Unlike the words such as 'tot-i', 'sal-i', 'cap-i', and 'pat-i' which have the structure of $[V_{STEM}+A_N\ (-i)]_N$, the following $[V_{STEM}+A_N\ (-i)]_N$ words such as 'mol-i' *chasing*, 'pul-i' *solving*, and 'nol-i' *play(ing)* appear independently. That means that when they combine with other nominals to form bigger compounds, the structure will be different from that of 'tot-i', 'sal-i', 'cap-i', and 'pat-i'. A detailed structure is shown below.

(a) $[[sasim]_N+[[mol]_V+[-i]A_N]]_N$
deer chase A_N
'deer-chasing'

(b) $[[muncæ]_N+[[pul]_V+[-i]A_N]]_N$
problem solve A_N
'problem-solving'

3. Generally speaking, when we say that a word is an independent word, it means that the word is listed in the lexicon. In this paper, I accept this point of view. However, to be more detailed, this point of view should not be completely plausible, since new words are continuously being formed, and are accepted as a word by the acknowledgement of the public.

4. A measure containing about 18 liters.

5. The nominalizing affix [-k'un], *a skillful person* can be attached to any nominals in (5) to form bigger derivatives, all of which are acceptable such as the following:

(a) mol-i-k'un *a skillful chaser*
(b) pul-i-k'un *an excellent problem-solver*
(c) nol-i-k'un *an excellent cheerleader or amuser who has a great talent for amusing others*

6. All '/-i/'s in (7) seems to express the same meaning of 'an action or behavior' . On the other hand, the '/-i/'s in (8) are all different from each other in their meaning. This fact will support my argumentation. The slightest difference of meaning of each verb stem in (7) and (8) has been identified by *The Great*

Korean Dictionary published by Keumseong Textbook Publishing Company(1994), Seoul, Korea.

7. We can find many words with the affix '-caŋi' in Korean.
   a. simsul-caŋi : 'a pervasive/contrary/cursed child(person)'
   b. yoksim-caŋi : 'a grasping/grabby/greedy fellow'
   c. yok-caŋi : 'a foul-mouthed/foul-tongued fellow'
   d. s'aum-caŋi : 'a quarrelsome/contentious person'
   e. mals'əŋ-caŋi : 'a troublemaker'

8. In actuality, we have much evidence which can confirm the independent usage of 'hætot-' type words in written documents of the Middle Ages. However, to consider the data in more detail will be beyond of the purpose of this paper. So I will skip more detailed discussion here..

9. In Korean, syntactic compounds do not involve the relation between Subject-transitive verbs , nor between Object-intransitive verbs.

10. Abney (1986, 1987) also maintains that NP has the same structure as IP which can be observed from the following parallel thematic relation between NP and its corresponding IP. Consider;

(1) a. Caesar destroyed the city
    b. Caesar's destruction of the sity

(2) b. DP
```
     / \
  Spec  D'
       / \
      D   NP
         / \
        N  (XP)
```

a. IP
```
     / \
  Spec  I'
       / \
      I   VP
         / \
        V  (XP)
```

11. Halle & Marantz (1993) suggests the following four as operations for word formation in syntax, (a) head movement and adjunction, (b) merger, (c) fusion, and (d) morpheme fission.

Mithun (1984) and Baker (1985, 1988) also explain Noun Incorporation as a head movement phenomenon. That is, they maintain that head movement is not

only for inflectional morphology such as the movement from V to I and to C, but it can also be extended to the movement from N to V.

12. `-ta' is a declarative marker which is located in [INFL, IP]. In actuality, this marker '-ta' does not have any relation with the discussion in this section. Thus, I will just ignore it here.

13. Noun Incorporation should occur before any other movement or before Case assignment. Or we have to assume another device /procedure for syntactically realized Case elimination. Here I assume the VP-internal Subject Hypothesis.

14. Recall that all movements for Noun Incorporation must occur between D- and S-structure.

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BINDING PRINCIPLE FOR LONG-DISTANCE ANAPHORS

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Abstract: This paper deals with long-distance anaphora, a binding phenomenon in which reflexives find their antecedents outside their local domain. I introduce various syntactic approaches to the phenomenon: Binding-domain parametrizing approach, Governing category parametrizing approach, SUBJECT parametrizing approach and Anaphor movement approach. I show that they cannot fully account for the long-distance anaphora. I suggest that semantic or thematic consideration are to be taken to give a full account for the long-distance anaphora.

1. Introduction

Chomsky's (1981) binding principle A for anaphors as in (1) has been challenged.

(1) An anaphor is bound[1] in its governing category.

The so-called 'picture noun reflexives'[2] in English and anaphors in some constructions, such as psychological predicate constructions or passives,[3] challenge the 'c-command' constraint of the principle. Long-distance anaphors in various languages challenge the 'binding-domain' constraint of the principle in the sense that long-distance anaphors have their antecedents outside their governing category. They also challenge the 'c-command' requirement.

In this paper, I will deal with the challenge of long-distance anaphors to the binding principle A. Long-distance anaphors are found in East-Asian languages such as Chinese, Japanese, and Korean, and also in Russian, Icelandic and Italian as follows.[4]

(2) a. Zhangsan$_k$ renwei Lisi$_j$ zhidao Wangwu$_i$ xihuan ziji$_{i/j/k}$.
Zhangsan thinks Lisi knows Wangwu likes self
'Zhangsan thinks Lisi knows that Wangwu likes himself.'
-Chinese (Cole, Hermon & Sung:1990, 1)-

b. Cheolsu$_k$-nun Youngshik$_j$-i caki$_{i/j/k}$-lul coaha-nun-keot-ul
Cheolsu-TOP Youngshik-NOM self-ACC like-ASP-COMP-ACC

Youngsu$_j$-ka alkoitta-ko saengkakha-n-ta.
Youngsu-NOM know-COMP think-ASP-DEC

'Cheolsu thinks that Youngsu knows that Youngshik likes himself.'
-Korean-

c. John$_j$-wa Bill$_j$-ga zibun$_{i/j}$-o nikunde iru to omotte iru.
John-TOP Bill-NOM self-ACC hates COMP think
'John thinks that Bill hates himself.'
-Japanese (Manzini & Wexler:1987, 419)-

d. Professor$_j$ poprosil assistenta$_i$ chitat' svoj$_{i/j}$ doklad.
Professor asked assistant read self's report
'The professor asked his assistant to read self's report.'
-Russian (Yang:1983, 179)-

e. Jón$_j$ segir að Maria$_i$ elski sig$_{i/j}$.
'Jón says that Maria loves(subjunctive) self.'
-Icelandic (Manzini & Wexler:1987, 417)-

f. Alice$_j$ vide Mario$_i$ guardare sè$_{i/j}$ nello specchio.
'Alice saw Mario look at self in the mirror.'
-Italian (Manzini & Wexler:1987, 416)-

It can be said that there are two main streams in dealing with these examples of long-distance anaphora. The first one is concerned with the parameterization of the binding domain, the governing category, or SUBJECT. The second one is related to movement at LF. I will examine various proposals along these lines and suggest the most appropriate approach to explain the long-distance anaphora.

2. Binding-domain parametrizing approach

The phenomenon of long-distance binding can be explained by eliminating 'governing category' from the binding principle. Since an anaphor which has a long-distance usage is bound either in its governing category or outside its governing category, it is no longer necessary that a governing category should exist in the description of the binding principle for the anaphor. This elimination of a governing category from the binding principle can be interpreted as parametrizing the binding domain to have a [-governing category] value. This line is taken by Hong (1985) and Lee (1983), especially for the explanation of long-distance anaphora in Korean. O'Grady (1986:18) introduces Hong's (1985) version of binding principle A as in (3).

(3) An anaphor is bound.

Lee(1983:211) reformulates the binding condition A which fits Korean data, as in (4).

(4) An anaphor need not be bound in its governing category.

These two binding principles seem to have the same effect if (4) is not interpreted as meaning that an anaphor can be unbound.

They can deal with all other long-distance anaphors in the above as well as the Korean long-distance anaphor. But they can not explain the following examples.

(5) Zhangsan$_i$ nayang zuo dui ziji$_i$ bu li
Zhangsan that-way do to self not advantageous
'That Zhangsan behaved in such a manner did himself no good.'
-Chinese (Battistella:1989, 999)-

(6) Cheolsu$_i$-ka caki$_{i/j}$-lul miweoha-n-ta-nun sashil-i
Cheolsu-NOM self-ACC dislike-ASP-DEC-ADJ fact-NOM

Youngshik$_j$-ul nolla-ke ha-yet-ta.
Youngshik-ACC frighten-CAUSE-PAST-DEC

'The fact that Cheolsu disliked himself frightened Youngshik.'
-Korean-

(7) Jón$_j$ segir að Maria$_i$ elskar sig$_{i/j}$.
'Jón says that Maria loves self.'
-Icelandic (Manzini & Wexler:1987, 417)-

The Chinese sentence (5) violates principle (3) because the antecedent *Zhangsan* does not c-command *ziji*. Nevertheless, the sentence is grammatical. The Korean anaphor *caki* in (6) has the same problem. Principle (3) can not explain why the Icelandic anaphor *sig* in (7) can not be bound by *Jón* in spite of the c-command relationship between the plausible antecedent *Jón* and the anaphor *sig*.

3. Governing category parametrizing approach

Manzini & Wexler (1987:422- 423) parametrize the governing category as in (8).

(8) γ is a governing category for α iff
γ is the minimal category that contains α and a governor for α and

a. can have a subject or, for α anaphoric, has a subject β, $\beta \neq \alpha$; or
b. has an Infl; or
c. has a Tense; or
d. has a 'referential' Tense; or
e. has a 'root' Tense;

if, for α anaphoric, the subject β', $\beta' \neq \alpha$, of γ, and of every category dominating α and not γ, is accessible to α.

Manzini & Wexler accept the definition of 'accessible' in Chomsky (1981), whereby a category is accessible to an argument α if and only if it c-commands α and it can be coindexed with α without violating the *i*-within-*i* Condition. According to the *i*-within-*i* Condition, no element can be contained in a category bearing the same index. As for the subject-control property of long-distance anaphors, Manzini & Wexler introduce

the concept of 'proper antecedent' and propose a revised binding principle A as in (9).

(9) An anaphor is bound in its governing category by a proper antecedent.

A proper antecedent for α is defined to be either a subject or else any element at all.

Let's apply this binding principle to the examples. The value of the governing category in (2a)-(2c) is 'root' Tense. All the subjects of these sentences are accessible to the anaphors. So the governing category is the root sentence. The proper antecedents for these anaphors are subjects. The anaphors are bound by any c-commanding subjects in the root sentence as the binding principle (9) predicts. In the Russian example (2d), the value of the governing category is Tense. The root sentence with accessible subjects to the anaphor *svoj* is the governing category. The binding principle correctly predicts that *svoj* can be bound by the embedded subject *assistenta* or the matrix subject *professor.* Principle (9) also correctly predicts that Icelandic *sig* in (2e) and Italian *sè* in (2f) are bound by their embedded subjects or matrix subjects.

Let's consider the examples (5)-(7). In (7), the governing category for Icelandic anaphor *sig* is the embedded sentence, but not the root sentence as in (2e) because the embedded sentence is the minimal category that contains *sig*, its governor, and the 'referential' Tense for Icelandic anaphor. *Sig* is bound only by the embedded subject as predicted. The Korean anaphor *caki* in (6) does not have a governing category. Before 'accessibility' is considered, the minimal category that contains *caki,* the governor for *caki*, and the 'root' Tense is obviously the root sentence. But the 'accessibility' requirement does not hold in a root sentence. The matrix subject [*Cheolsu-ka caki-lul miweoha-n-ta-nun sashil-i*] is not accessible to *caki* because the coindexaion of *caki* and the subject, represented as [*Cheolsu-ka caki$_i$-lul miweoha-n-ta-nun sashil-i*]$_i$ violates the *i*-within-*i* Condition, whereas the embedded subject of the root sentence *Cheolsu* is accessible to *caki.* Therefore, *caki* does not have a governing category and is correctly predicted to pick its antecedents freely. The antecedent of *caki* in (6) can be *Cheolsu* or *Youngshik.*

Principle (9), however, faces difficulty in explaining the anaphoric relation in (5). The governing category for Chinese anaphor *ziji* in (5) is

the root sentence because there is no 'accessibility' problem in this case. Principle (9) can not predict that *ziji* refers to *Zhangsan* because *Zhangsan* in the embedded sentence can not c-command *ziji* in the matrix sentence.

4. SUBJECT parametrizing approach

Progovac (1992) proposes what she calls 'relativized SUBJECT' analysis to explain long-distance anaphors. Her approach is regarded as the parameterization of SUBJECT as either Agr or a subject, [NP, NP] or [NP, IP]. Progovac's (1992:672) principle for long-distance anaphors is composed of the following two parts:

(10) An X^0 reflexive must be bound to Agr, as the only salient (c-commanding) X^0 category.

(11) Agr is the only SUBJECT for X^0 reflexives.

She assumes that Chinese has syntactic Agr, but that its morphological emptiness makes it anaphoric, or dependent on coindexation with higher Agr. She argues that this assumption provides a persuasive explanation for the subject-oriented property of *ziji* and blocking effects whereby long-distance binding is blocked if a different person Agr intervenes. The examples of East-Asian languages, (2a)-(2c) can be explained in this way. If Agr in Chinese, Japanese, or Korean is anaphoric and bound to a higher Agr, the SUBJECT is the whole Agr chain and the domain extends up to the whole sentence, which includes the head of the chain. The anaphors in (2a)-(2c) are bound by either of the Agr's in each sentence respectively, and then, by transitivity, they can be bound by either of the subjects in each sentence.

Progovac (1992:677) deals with long-distance anaphora in subjunctives. She argues that the extension of the binding domain in subjunctives is achieved through the LF transparency ('invisibility') of recoverable functional categories (e.g., INFL and COMP). Subjunctive INFL which does not host independent Tense is recoverable and transparent at LF. Therefore, Agr in subjunctives can not count as a SUBJECT. In that case, the matrix indicative Agr functions as a SUBJECT. But let's compare (2e) with (12).

(12) Alice$_j$ pensava che Mario$_i$ avesse guardato sè$_{i/j}$
'Alice thought that Mario had (subjunctive) looked at self

nello specchio.
in the mirror.'

-Italian (Manzini & Wexler:1987, 416)-

The proposal that Agr in subjunctives is not a SUBJECT can not deal with (12), even though it can account for (2e). In (12) , Agr in subjunctive should be a SUBJECT and the binding domain should be confined to the embedded sentence.

This approach can not account for (5) and (6) in which the c-commanding relation between antecedents and anaphors is not observed, because this approach assumes such a structural relation.

5. Anaphor movement approach

Cole, Hermon & Sung's (1990) and Battistella's (1989) approach The anaphor movement approach, which is quite different from preceding ones, is proposed by Cole, Hermon & Sung (1990) and elaborated by Battistella (1989). They account for the fact that reflexives may be indefinitely far from their antecedents in the languages like Chinese, Japanese and Korean, by a unified and entirely local theory of antecedents for bound anaphors, which applies to English as well. What is most distinguishing is that they relate binding to successive cyclic movement at LF, whose process is similar to that of *wh*-movement. The possibility of long-distance reflexives is due to this property of INFL. In languages which allow long-distance reflexives, INFL is lexical and a proper governor, while in other languages, one of which is English, INFL is functional and not a proper governor. If INFL is lexical, VP is L-marked by INFL and is not a barrier. The anaphor movement to INFL crosses no barrier and the trace of the anaphor is properly governed by INFL, which results in no ECP violation.[5] The subject orientation or subject-control property of long-distance anaphors results from the process of INFL-to-INFL movement. Since only the subject of a clause c-commands INFL, the subject is the only possible antecedent for the long-distance anaphors.

Battistella (1989) elaborates this movement to INFL approach. She accounts for the tricky example (5). The INFL heading the nominal subject clause receives its agreement index from its subject *Zhangsan*$_i$

and then, the percolation of agreement features from INFL to S follows. *Ziji* in the INFL of the matrix clause is c-commanded by the nominal subject and can be coindexed with this nominal subject. This means that *ziji* receives index *i*. Since antecedenthood is a relation between indices, *Zhangsan*$_j$ can be the antecedent of *ziji*$_i$. This approach still can not account for (6), another example in addition to (5), in which the relation between antecedents and anaphors does not satisfy the c-commanding requirement.

A serious problem with this approach is that it can not be extended to the long-distance anaphora different from that of Chinese, Japanese and Korean. The essential correlation that is assumed in Cole, Hermon & Sung (1990) and Battistella (1989) is that INFL in languages which allow long-distance anaphors is lexical and a proper governor. If it is true, INFL in Russian, Icelandic and Italian is lexical and a proper governor because these languages show long-distance anaphors as in (2d)-(2f). Therefore, this approach can not explain some complex sentences in which long-distance anaphora is not allowed, as in (7), (12) and in the following example (13), because the approach always predicts the binding domain is the whole sentence so far as INFL is lexical.

(13) Vanja$_j$ znaet c'to Volodja$_i$ ljubit svoj$_{i/*j}$-u z'en-u.
Vanja knows that Volodja loves self's-ACC wife-ACC
'Vanja knows that Volodja loves self's wife.'
-Russian (Progovac:1992, 674)-

Yang's (1991) approach Yang (1991) also takes an anaphor movement approach. But he rejects Cole, Hermon & Sung's assumption that only so-called 'non-phrasal' anaphors may undergo X^0 movement, wherease only so-called 'phrasal' anaphors may undergo XP-movement. Yang (1991:428) claims that 'non-phrasal' anaphors like Korean *caki* have properties of XP's as well as heads and that this dual property of *caki* can explain the cases of non-subject-orientation as well as subject-oriented anaphora. If Korean anaphor *caki* as XP is assumed to undergo QR (Quantifier Raising), it can adjoin to VP or IP. If it adjoins to VP, it is licensed by the object in terms of the adjacent government. On the other hand, if it adjoins to IP, it is licensed by the subject. This means that this approach can deal with the tricky Korean example (6) which can be explained only by Manzini & Wexler (1987), among the other approaches. If *caki* in (6) first adjoins to IP in the embedded sentence, it is licensed by the embedded subject *Cheolsu*, that is, the antecedent of *caki* is *Cheolsu*. If it moves further and adjoins to VP in the matrix sentence, it is licensed by the matrix object *Youngshik*. Chinese

example (5), however, can not be explained, regardless of whether Chinese anaphor is assumed to undergo XP movement or X^0 movement. This movement approach can not associate the anaphor *ziji* with the antecedent *Zhangsan* in (5) because *ziji* in (5) is the matrix object and *Zhangsan* is the embedded subject.

Yang (1991:415) proposes the principle of feature percolation between the index feature of an anaphor and its adjoined INFL as in (14).

(14) An agreement-sensitive element induces feature percolation.

If Korean *caki* and Japanese *zibun* are not assumed to be agreement-sensitive elements, they are free to move to the matrix INFL without inducing percolation and feature conflict. Korean example (2b) and Japanese example (2c) can be dealt with in this way.

The problem of this approach is, as Yang (1991:415) points out, that there is no explicit criterion for agreement-sensitivity which is the essence of this approach. Yang assumes that English 'phrasal' anaphors like *himself*, are agreement-sensitive elements whereas the Korean 'non-phrasal' anaphor *caki* is not. But the 'phrasal' or 'non-phrasal' distinction between anaphors in languages does not decide whether a given anaphor is agreement-sensitive or not. For example, Chinese *ziji*, though it is 'non-phrasal', is assumed to be an agreement-sensitive element with respect to phi-features.[6]

This approach can not deal with the Italian example (12) under the assumption that [+indicative INFL] in Italian is an agreement-sensitive element, like Progovac's (1992). In (12), if Italian anaphor *sè* has the index of the embedded subject *Mario*, there is no feature conflict because [+subjunctive] INFL is not regarded as an agreement-sensitive element. Even if Italian anaphor *sè* has the index of the matrix subject *Alice*, no feature conflict occurs because the index feature of *sè* which percolates to the matrix INFL is the same one that the INFL receives from the matrix subject through SPEC-Head Agreement. But this prediction is wrong. As (12) shows, the coindexation between the matrix subject and the anaphor is not allowed.

6. Conclusion

No approach is found to deal with long-distance anaphors exclusively and elegantly. The binding domain parametrizing approach allowing only two domains loosely can not deal with the variations of the binding domain language by language, and it can not deal with examples which do not observe the rigorous c-commanding requirement between anaphors and their antecedents. The governing category parametrizing approach can not deal with a long-distance anaphor which is not c-commanded by its antecedent. Manzini & Wexler (1987) try to avoid the c-commanding requirement. The SUBJECT parametrizing approach has a similar problem that the binding domain parametrizing approach has, even if more improved with regard to binding domain. The anaphor movement approach has a problem similar to the binding domain parametrizing approach, even if more improved concerning the binding domain and c-commanding requirement, especially in Yang (1991).

Two mechanisms should be included in any insightful approach to deal with long-distance anaphors across languages. One mechanism is concerned with defining the binding domain, depending upon a language. This will take some form of a strict and precise parameterization according to languages. The other mechanism is to escape the c-commanding requirement in certain constructions. Feature percolation in Battistella (1989) or the assumption of XP property of Korean X^0 anaphor in Yang (1991) can be regarded as an attempt to do this. That may be helped by semantic or thematic constraints as in Tang (1989), or Grimshaw (1990). Tang (1989:101) proposes the animacy condition that the antecedent of a reflexive must be animate in Chinese. According to Tang, *Zhangsan* in (5) can be an antecedent for *ziji* because the nominal subject clause containing *Zhangsan* c-commands *ziji* even if *Zhangsan* does not c-command *ziji*, and *Zhangsan* is animate. Grimshaw (1990:167) points out that long-distance anaphors in psychological predicates, for example, *frighten*, take arguments of maximal thematic prominence as their antecedents. The object of a psychological predicate, as in (6), though it does not c-command the anaphor, is the antecedent for the anaphor because the object as Experiencer is thematically more prominent than the subject as Theme.[7]

Anyway, semantic or thematic theory should intervene in the explanation of long-distance anaphors, because syntactic theory alone can not explain that substitution of a predicate can affect long-distance

anaphora in the following examples since the substitution does not make any difference in configuration or grammatical relations.

(15) John$_j$-un Bill$_i$-i caki$_{i/j}$-lul shileohanta-ko saengkakhanta. -Korean-
John$_j$ renwei Bill$_i$ taoyen ziji$_{i/j}$. -Chinese-
John$_j$-wa Bill$_i$-ga zibun$_{i/j}$-o nikundeiruko-to omotteiru. -Japanese-
'John thinks Bill hates self.'

(16) John$_j$-un Bill$_i$-i caki*$_{i/j}$-lul burewehanta-ko saengkakhanta. -Korean-
John$_j$ renwei Bill$_i$ chitu ziji*$_{i/j}$. -Chinese-
John$_j$-wa Bill$_i$-ga zibun*$_{i/j}$-o urayandeiru-to omotteiru. -Japanese-
'John thinks Bill envies self.'

(17) John$_j$-un Bill$_i$-i caki$_{i/*j}$-lul tallyeonhanta-ko saengkakhanta. -Korean-
John$_j$ renwei Bill$_i$ chientao ziji$_{i/*j}$. -Chinese-
John$_j$-wa Bill$_i$-ga zibun$_{i/*j}$-o imashimeru-to omotteiru. -Japanese-
'John thinks Bill disciplines self.'

In (15), Korean *caki*, Chinese *ziji* and Japanese *zibun* can refer to either the embedded subject *Bill* or the matrix subject *John* respectively. In (16), the anaphors only refer to the matrix subject *John*. In (17), the anaphors can not have long-distance antecedents unlike the former cases, but they only refer to the embedded subject *Bill*.

NOTES

[1] α is *bound* by β if and only if α and β are coindexed, and β c-commands α. β *c-commands* α if the first branching node dominating β dominates α, and if neither β nor α dominates the other.

[2] This term refers to the reflexives in the structure of [$_{NP}$ [DET] picture of self]. The antecedent for a 'picture noun reflexive', in general, need not c-command the anaphor. Postal (1971) uses this term and defends the view that 'picture noun reflexives' are not subject to the

same constraint as 'ordinary reflexives'. The following is some examples.

(1) The picture of himself$_i$ in the museum bothered John$_i$.
(Pollard & Sac:1992, 264)

(2) The picture of herself$_i$ on the front page of the *Times* made Mary$_i$'s claim seem somewhat ridiculous. (Pollard & Sac:1992, 2)

(3) Pictures of themselves$_i$ would please the boys$_i$.
(Tang:1989, 116)

[3] Examples (1), (2) and (4) are concerned with psychological predicate constructions and examples (3) and (5) are related to passives.

(1) [La [propria]$_i$ salute] preoccupa molto Osvaldo$_i$.
'Self's health worries Osvaldo a lot.'
-Italian (Grimshaw:1990, 164)-

(2) [[[Zhangsan$_k$ de] tuisang]$_j$ de yangzi]$_i$ shi ziji$_{i/*j/k}$ de
Zhangsan GEN depression GEN manner make self GEN

fumu hen danxin.
parents very worry
'Zhangsan's depression worried his parents.'
-Chinese (Tang:1989, 106)-

(3) [[[Zhangsan$_k$ de] baba]$_j$ de qian]$_i$ bei ziji$_{i/j/*k}$ de
Zhangsan GEN father GEN money by self GEN

pengyou touzou le.
friend steal ASP
'Zhangsan's father's money was stolen by his friend.'
-Chinese (Tang:1989, 104)-

(4) [[John$_j$-uy] kwake$_l$-ka] caki$_{i/j}$-lul koylophi-n-ta.
John-GEN past -NOM self-ACC ail
'John's past ails self.' -Korean (O'Grady:1987, 254)-

(5) [[Cheolsu$_j$-uy ilkicang$_l$-i] caki$_{i/j}$ chaeksang-e noyeoit-ta.
Cheolsu-GEN diary-NOM self desk -LOC be laid
'Cheolsu's diary is laid on his desk.' -Korean-

[4] In glosses, ACC=Accusative marker, ADJ=Adjectival Marker, ASP=Aspect marker, DEC=Declarative marker, GEN=Genitive marker, NOM=Nominative marker, LOC=Locative Marker, TOP=Topic marker.

[5] According to Chomsky (1981,1986), ECP(Empty Category Principle) is a requirement for traces which are left behind after *Move-α*. ECP requires that every trace must be properly governed. Proper government is achieved when there is no barrier between governors and governees. Chomsky (1986:14) relates barrierhood to L-marking. In short, if a maximal projection γ is L-marked, it can not be a barrier. L-marking is defined as follows, in Chomsky (1986:24). Where α is a lexical category, α L-marks β iff β agrees with the head of γ that is θ-governed by α. θ-government is defined as follows:

> α θ-governs β iff α is a zero-level category that θ-marks β, and α, β are sisters.

[6] Chomsky (1981:330) refers to the members of φ as φ-features. The set φ includes person, number, gender, Case, etc.

[7] Grimshaw (1990:7-8) assumes the thematic hierarchy in which the Agent is always the highest argument. Next ranked is Experiencer, then Goal/Source/Location, and finally Theme.

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Functional Projections and Event Structure

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Abstract: The variable behavior verbs in unaccusative/unergative alternation in Dutch, Italian, and Hebrew led Borer(1993) to deny the "lexical-entry-driven approach. Following Van Valin(1990), she concludes that the unaccusative/unergative distinction is altogether not a syntactic one, but rather an aspectual/semantic one. Thus, for her, the distinction is completely dependent on the properties of the entire predicate, of which the meaning of the verb is just one part. In this paper, we point out some theoretical problems in Borer(1993)'s radical suggestion and suggest a solution.

0 Introduction

By focusing on the variable behavior verbs[1] in unaccusative/unergative alternation observed in Dutch ,Italian, and Hebrew, Borer (1993) denies "the lexical-entry-driven approach" which says that lexical entries determine the projection of specific arguments.[2] Further, following Van Valin (1990), she observes that syntactic unaccusative diagnostics are associated with telic and non-agentive characteristics, and syntactic unergative diagnostics are typically associated with agentive interpretation. Based on these observations, she finally concludes that "the unaccusative/unergative distinction is altogether not a syntactic one, but rather, an aspectual/semantic one." Thus, according to her, the distinction is completely dependent on the properties of the entire predicate, of which the meaning of the verb is just one part.

Though Borer's radical approach has a great insight into the controversial issue of the classification of verb types, it has some defects concerning the separation of adjunct PP's from argument PP's, the projection of a functional aspectual category closely related with Case assignment, and the functions of the two functional categories. To solve these problems, we will maintain the split of Borer's aspectual functional projection $ASP\pm_{EM}P$ into two independent functional projections such as AGR_OP and $ASP_{EM}P$. The detailed conditions on derivation under the new structure will be added in section 3.

1. Aspectual but not syntactic difference between directional PPs

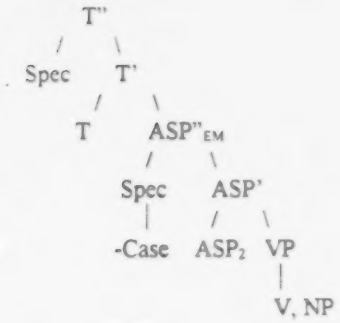
Borer's (1993) point of view against the distinction of intransitives is clearly shown in the following quotation:

> " ...concerning the unaccusative/unergative alternation ... [V]erbs are not basically unaccusatives or unergatives, nor are they specified as projecting an internal or an external argument respectively. Rather, all are intransitive, and in accordance with the basic meaning of the verb, plus whatever other material resides in the predicate, a predicate would be assigned specific aspectual (AKTIONSART) properties, and the syntactic properties would then follow. ..." (Borer 1993, p.4)

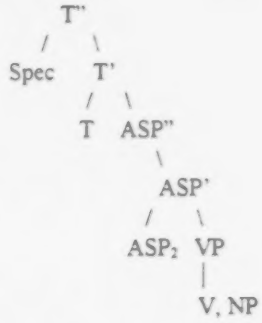
That is, the single argument of verbs such as *run, wilt, disappear* is not specified as 'external', 'internal', nor are there any syntactic linking conventions in lexical entries associated with the projection of arguments. They are just intransitives with one argument. And a maximal projection, the VP, is "projected containing unprojected and hence unordered and unhierarchical argument(s)."[3] Aspectual roles from the entire predicate which is gained in a compositional way, then, decide on the configuration of the sentence given. The structures Borer suggests for intransitives are as follows:

1) Structures for Intransitives (ibid., p.p. 9-10)

(a) Unaccusatives
:Spec projected, no Case assigned.



(b) Unergatives
:Spec not projected, Case not available



The movement of argument(s) under the VP is caused by the necessity of Case. As we clearly see from the above, the syntactic distinction between unergatives and unaccusatives is not available until the maximal category VP projects further. And the projection of the structure is entirely dependent on the aspectual role(s) which is(are) given from the compositional meaning of the entire predicate.
Thus, when there is an aspectual role of Event Measure as in (1a), the verb belongs to the unaccusative class and when there is none, then the verb belongs to the unergative class as is shown in (1b).
Then we can raise the question : "How can we get aspectual role(s) from the lexical entries?." Within Borer's framework, it seems to be completely up to the speaker's parsing of the event which is expressed by the entire predicate.

Consider Borer's explanation of the alternation of the intransitive '*run*' for example:

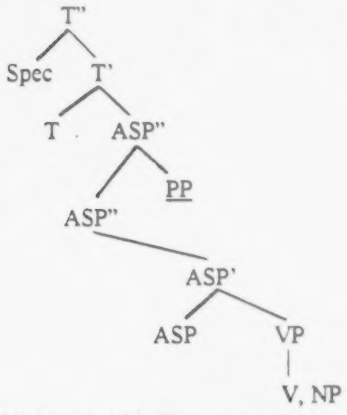
" ...Turning now to intransitive motion verbs such as *run*, note that certainly they do not imply a delimitation. However, the argument of such a verb, other than being interpreted potentially as an AGENT, can also be interpreted as a MEASURE. Specifically, in *John ran*, *John* could be understood as measuring out the running event. ..." (ibid., p. 12)

Therefore, the subject of *run* may be either a MEASURE, in which case *run* is unaccusative, or a non-MEASURE in which case *run* is unergative, depending on whether derivation (1a) or (1b) is pursued.
Now, based on the argument so far, let us consider the following sentences:

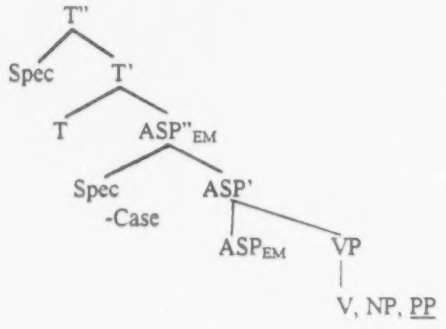
(2) a. John ran in the park.
b. John ran to the park.

According to Borer's explanation, the PPs in (2) are different from each other: '*in the park*' in (2a) is an adjunct, while '*to the park*' in (2b) is an argument.[4] Thus, their syntactic positions are distinct.[5] The structures are shown in (3):

(3) a. (=2a)



b. (=2b)



In addition to (3), Borer suggests the following assumption:

(4) Whatever stays in the VP incorporates semantically (and at times syntactically as well). (ibid., p. 13)

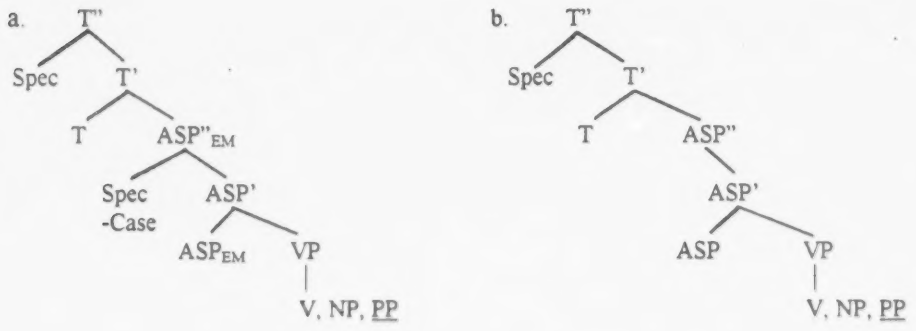
Semantic incorporation in (4) would mean to "enter the PP argument, as a delimiter, into the interpretation of the ASPP subpredicate in structures as (2b)", while an adjunct does not enter the interpretation in a similar fashion.[6]

From the condition (4) and the structural difference of PPs in (2), '*in the* park' and '*to the* park' respectively, we clearly see that unlike the argument PP, the adjunct PP does not do any semantic contribution to form aspectual role(s) of a sentence. If it is the case, then,

we might ask why we have to admit the structural difference between (2a), '*John ran in the park*', and (2b) ' *John ran to the park.*' When we have the lexical entries '*John*' and '*to the* park' led by the verb '*ran*' under the maximal projection VP, we are able to have the aspectual role MEASURE from the delimiter '*to the park*'. Thus, we have the delimitedness reading only and the existence of the aspectual role causes the projection of the $ASP_{EM}P$. The other unergative reading is impossible.

On the other hand, when we look into the sentence (2a), " *John ran in the park*," more carefully, we immediately know that there are two possible structures instead of one which Borer shows. Further, they are different from that of Borer's in the adjunct's position. Consider the following structures:

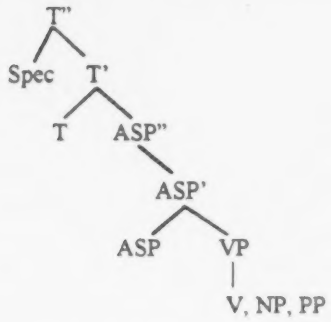
(5) Two Possible Structures of (2a), " *John ran in the park.*"



The structures shown above are easily deducible from the two possible structures for " *John ran,*" which are shown in (1). The PP '*in the park*' is an adjunct, so it is not incorporated into the semantics of the whole predicate as Borer assumes. (recall the condition (4)). In addition, the PP '*in the park*' is usually not supposed to do any contribution to the meaning of the predicate to form any aspectual role. All these pieces of evidence leads us to conclude that we do not have any motivation to have the locational PP '*in the park*' adjoined to aspectual nodes which are outside the lexical VP and therefore no syntactic distinction between them.[7] (6) will be the resulting structures concerning the argument so far:

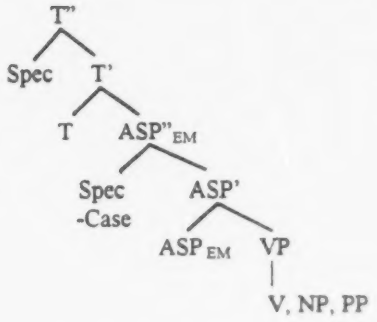
(6) Structures for Intransitives with a PP

a. Unerg. Reading with an Adjunct PP



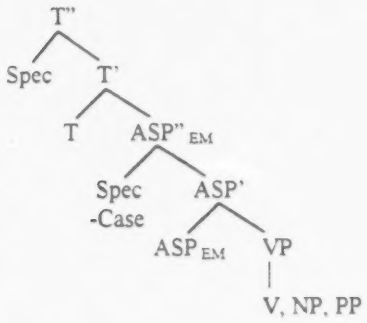
(ex.) John ran in the park.

b. Unacc. Reading with an Adjunct PP



(ex.) John ran in the park.

c. Unacc. Reading Only with an Argument PP



(ex.) John ran to the park.

Concerning the structure (6c) which is for the Unaccusative reading only, we might ask the question: "What if the PP, " *to the park* ", instead of the NP, "*John*" moves first to the Spec of the ASPP and then the NP, "*John*" moves to the Spec of the TP?" In actuality, this possibility is prevented in Borer's framework because the $ASP_{EM}P$ is associated with the assignment of the Accusative Case and the PP cannot be a Case recipient. We will return to this issue in Khym & Kookiattikoon (forthcoming).

2 Discrepancy in Grammatical Functions of Aspectual Functional Projections

The aspectual functional projections Borer (1993) offers are $ASP_{EM}P$ and $ASP_{OR}P$. The $ASP_{EM}P$ is projected when there is an aspectual role of MEASURE available from the entire predicate.[8] The aspectual role MEASURE is assigned to the Spec position by the Spec-head relationship only when the Spec of the $ASP_{EM}P$ is projected. That is, the Spec position is optionally projected. The ASPP is assumed for "interpretational reasons" and also, is responsible for the Accusative Case assignment, in which point it is very similar to

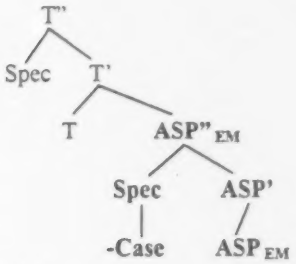
Chomsky's AGR_OP. On the other hand, $ASP_{OR}P$ is only for the aspectual role of ORIGINATOR which is mostly the same with AGENT or INSTIGATOR. At least one of the two aspectual roles, therefore at least one Aspectual node, should be projected in the structure. Unlike the $ASP_{EM}P$, the $ASP_{OR}P$ is only concerned with the assignment of the aspectual role. In this section, we will, firstly, argue that Borer's assumptions on the projection of the Spec of the $ASP_{EM}P$ has some problems. Secondly, we will argue against the discrepancy in grammatical function between the two aspectual projections, such as $ASP_{OR}P$ and $ASP_{EM}P$. Thirdly, we will argue against Enç's (1991) 'Partitive Case Hypothesis' which is adopted by Borer: it does not fit with that of English Case system. The solution will be maintained in section 3.

2.1. Available structures of $ASP\pm_{EM}P$ by Borer (1993)

The various structures of the $ASP_{EM}P$ which Borer (1993) assumes for Intransitives and Transitives are shown in the following:

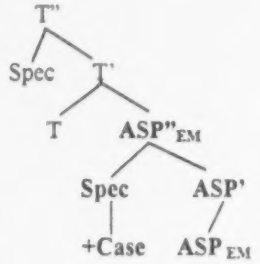
(7) For Intransitives : (a) for unaccusatives & (c) for unergatives, (b) ruled out.

a.



Measure

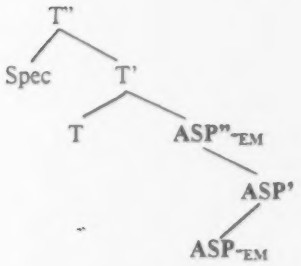
* b.



Measure

(ex.) The window broke.
John ran.

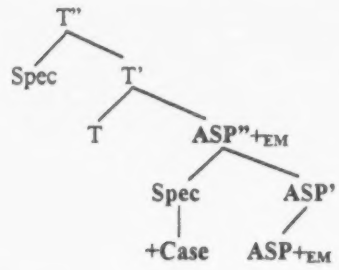
c.



(ex.) John walked.
John ran.

(2) For Transitives : (a) for MEASURE reading & (b) for non-MEASURE reading.

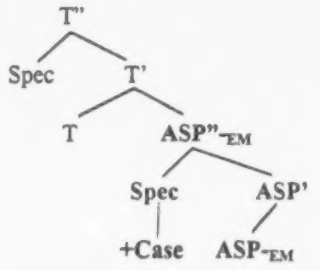
a.



Measure

(ex) Tom saw the film.
Tom ate the apple.

b.



(ex) Tom knows the answer.
Robin inhabited the house.

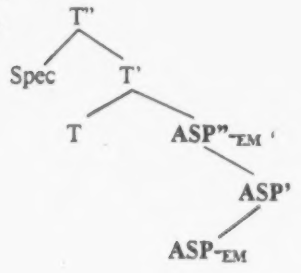
When we first focus on the matter of the projection of the Spec of the $ASP_{EM}P$ related with the MEASURE reading, the projection of the Spec of the $ASP_{EM}P$ for intransitives should be optional because "the full projection will invoke the MEASURE reading." This assumption implies that the unergative reading should have an unprojected Spec. That is, the $ASP_{EM}P$ should not be fully projected. This explanation does work as far as intransitives are concerned. However, when we apply this explanation to transitives, it reveals inconsistency. Let us consider the structures for transitives.

As we can see from (7: 2a) and (7: 2b), the Spec of the $ASP_{EM}P$ is fully projected. However, for (7: 2b), the MEASURE reading is not allowed. The ASPP of (7: 2b) is specified as -EM though the maximal category is complete with the Spec projected. The reason Borer needs this variation is directly from her assumption that the fully projected $ASP_{EM}P$ is responsible for the Accusative Case assignment as well as MEASURE reading. In (7: 2b), all the direct objects need Accusative Case, and the Case is assigned through the Spec-Head relation of the ASPP. However, they are not allowed to have the MEASURE reading. Therefore, the assumption that "the fully projected $ASP_{EM}P$ triggers the MEASURE reading" is not universal.

Secondly, let us consider (7: 1a). The Spec of the $ASP_{EM}P$ is marked -Case. It should be so, since the subject should be associated with Nominative Case. Along the same line, consider (7: 1b) which is for the unergative reading. The Spec is not projected ,as we expect, to prevent the MEASURE reading. There is no need to add [-Case] to the Spec here because Case is assigned to the Spec position and the Spec is not there. However, we can think of another possible structure for the unergative reading. Consider next ((8a) is the repeat of (7: 1c) and (8b) is another possible structure.):

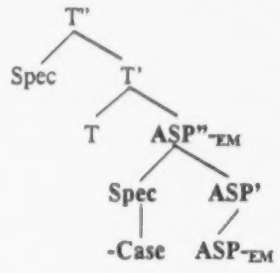
(8) Another Possible Structure for the Unergative Reading

a (= 7:1c)



(ex.) John walked.
John ran.

b.



(ex.) John walked.
John ran.

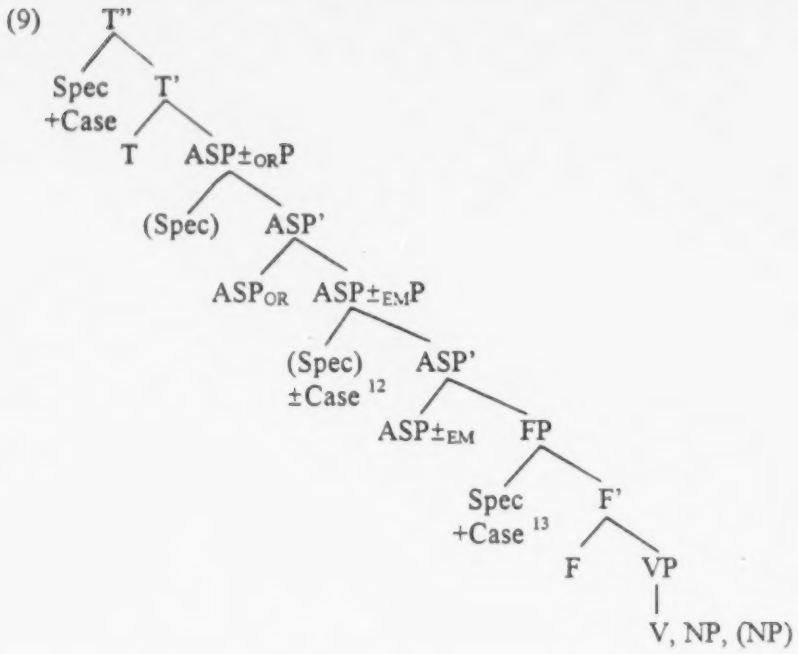
As we can see from the structure (8b), the structure surely allows the Unergative reading for '*John ran*', and '*John walked*'. There arises no Case-related problem. The NP under the VP will move first to the Spec of the $ASP_{-EM}P$. The NP neither fulfills the Case filter there, nor receives any aspectual role there, so that it has to move on to the Spec of the TP to get Case. It might land at the Spec of the $ASP_{OR}P$ during the movement. In actuality, there is no condition to prevent this movement in Borer's framework. However, this possibility is not explored. The only explanation available in Borer (1993) concerning this problem is that for intransitives, if the Spec of the $ASP_{EM}P$ is projected, then the MEASURE reading should be activated, while for transitives, the projection of the Spec might or might not activate the MEASURE reading, which is not quite attractive.

As we have shown above, Borer's assumption concerning the full projection of the $ASP\pm_{EM}P$ attached with the [±Case] assignment feature needs more explanation due to the following problems: firstly, there is no universal and systematic explanation concerning why the Spec of the $ASP_{EM}P$ is "optionally" projected.[9] Secondly, what determines the possible combination of the [±Case] feature and [± EM] aspectual feature for the Spec of the $ASP\pm_{EM}P$? That is, there is no sure reason available theoretically and empirically for one Aspectual maximal projection with two functions of Case and Aspectual role(s).[10]

2.2 Inconsistency in Functions of Two Functional Aspectual Projections

The functional projections Borer suggests are TP, FP, $ASP_{OR}P$ and $ASP_{EM}P$. And the latter two are Aspectual functional projections.[11] Given the two aspectual projections, we usually expect that the two will show and have the same characteristics and function(s). However, they don't. And this fact supplies us another problem for Borer's structure.

Let us consider first the aspectual categories and their functions. The following is a fully projected structure from Borer (1993, p.17):



As we can see from the fully projected structure above, there is a difference in role(s) between aspectual projections. That is, unlike the $ASP_{OR}P$, the $ASP\pm_{EM}P$ is associated with both Case and Aspectual role assignment. In addition, there is another inconsistency among all the functional/aspectual projections. All the other functional/aspectual projections except $ASP_{OR}P$ are able to discharge Case. And there is no explanation concerning why only the $ASP_{OR}P$ is defective in Case compared with all the other projections above the VP.

2.3 Partitive Case Hypothesis and English Case System

Consider the following data from Borer (1993, pp. 15-16):

(10) a. Kim built **the** houses (*for a year / in a year) --> M. reading
b. Kim built houses (for a year / *in a year) --> -M. reading
c. Kim built **some** houses / **many** houses (for a year / in a year) --> Ambiguous
d. Kim built **a** house / **two** houses (for a year / in a year) --> Ambiguous
e. Kim built **every** house (*for a year / in a year) --> M. reading

Focusing on the distinction of MEASURE only / ambiguity reading of the data in (10), Borer says that " the assumption that objects move to [SPEC, ASPP] in order to receive Accusative Case fails to provide any insight into the distinctions presented in (10 a-d)."

To explain this problem , she depends on the argumentation from the semantic perspective offered by Heim (1982) and the syntactic elaboration suggested by Diesing (1990) and Runner (1991).

Her argument begins with the distinction between "definite/ specific/quantified Nps[14] and non-specific/ non-partitive NPs. The former NPs will move to the Spec of the $ASP_{EM}P$ to activate a MEASURE reading , and at the same time will receive Accusative Case.
On the other hand, the latter NPs will neither be allowed to move to the Spec of the $ASP_{EM}P$, nor activate a MEASURE reading. With this argument, Borer actually changes the motivation of the movement of the direct objects from syntactic Case to semantic properties. The movement of direct NP objects to the Spec of the $ASP_{EM}P$ is conditioned by the Mapping Hypothesis offered by Diesing (1990). The Mapping Hypothesis is as follows (Borer (1993, p.16):

(11) The Mapping Hypothesis (Diesing, 1990)

: Material in the IP area of a clause (external to the VP) maps onto a restrictive clause and material in the VP maps onto the nuclear scope.

[Quantifier] [restrictive clause] [nuclear scope] (Heim, 1982)

With the Mapping hypothesis, Diesing insists that " non-quantificational NPs and non-specific NPs remain in the nuclear scope, functioning as variables subject to existential closure."

Borer's argument is strongly supported by evidence from Germanic Object Shift observed by Kratzer (1989), Diesing (1990, 1993) and Deprez (1993). They argue that Germanic definite and quantificational NP objects move outside the VP and escape nuclear scope, but indefinite NP objects don't.

The definites and quantifiers are "**precisely**" the direct objects which function as a MEASURE in (10 a & b). Based on the observations, she argues that the motivation of the direct specific/quantificational NP objects to the Spec of the the $ASP_{EM}P$ is exclusively caused by the Mapping Hypothesis, not by Case necessity. "While this is so," she still maintains, " Accusative Case is also associated with that position, and so, NPs landing at the position will be thus marked."

To handle the Case assignment problem of the non-specific / non-partitive NP objects, Borer introduces another functional projection , FP, which is above the VP, but below the the $ASP\pm_{EM}P$. And when the FP is projected, it implies the $ASP\text{-}_{EM}P$ with the Spec not projected.

Though Borer's theory for the distinction between ±[specifics / quantifiers / definites] works, it has to explain the following problems. First, her explanation lacks theoretical consistency in dealing with the same aspectual phenomenon of [-EM]. Consider the following data all of which have non-MEASURE reading:

(12) a. Kelly knows the answer.
Robin inhabited the house.

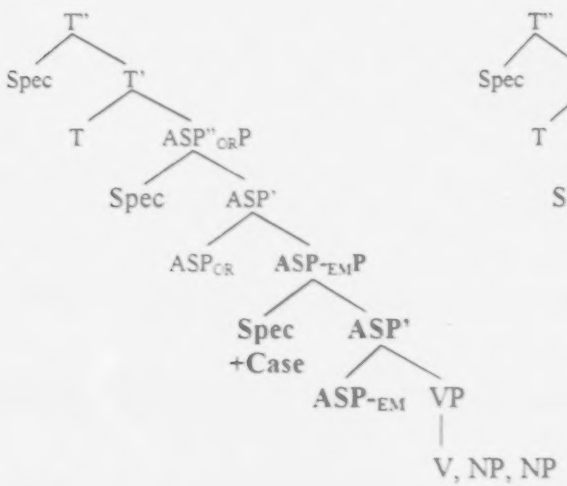
(Borer 1993, p.14)

b. Kim built houses.
Robin climbed some mountains. (non-partitive reading)

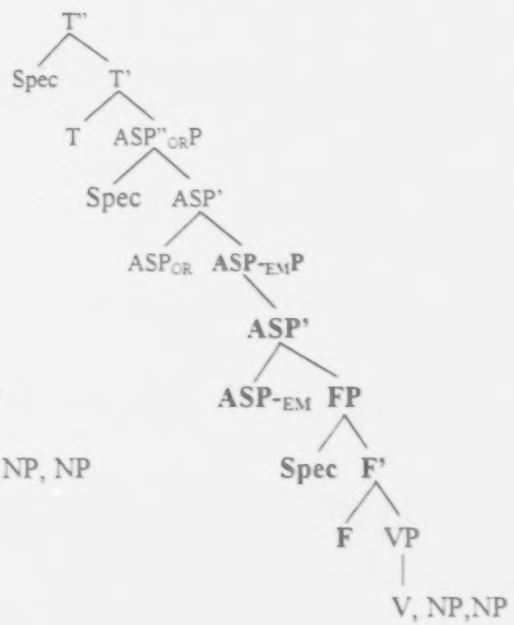
(ibid., pp.15-16)

The only difference between the (a) and (b) data is that the sentences in (12a) cannot have a MEASURE reading though definite NPs instead of indefinites are there, while in (12b), we can have a MEASURE reading if we have definite / specific / quantificational NPs in the position which is taken by the indefinite / bare-plural NPs. However, is the difference big enough to cause different structures for them? The following show the difference in structure respectively:

(13) a. Structure of (12a)



b. Structure of (12b)



Borer's insight into two different structures for transitives with one direct argument might be successful in dealing with the difference between them ; that is , unlike (12a) , (12b) is able to have a MEASURE reading with specific/definite direct NP objects. However, there might be other argumentation concerning this matter.

Surely the data, (12a) and (12b) are different from each other in whether they can have a MEASURE reading. However, if we only focus on the aspectual role of MEASURE, they

are exactly the same. Both of them have a non-MEASURE reading. The existence of corresponding sentences of (12b) with definite / specific NP objects and thus, with a MEASURE reading should not influence the analysis of MEASURE/non-MEASURE reading of sentences in (12b), since they are actually different in their lexical entries. Different lexical entries cause different aspectual roles. They cannot be compared together.

Secondly, the data Borer shows to support her distinction between definite / specific / quantificational NPs and indefinite / non-specific NPs in terms of different structures can count another counter-argument against her own. Consider the following data:

(14) a. John ran.
b. John ran in the park.

(15) a. Kim built some houses / many houses (for a year / in a year)
b. Robin climbed some mountains / many mountains (for two days / in two days)

(14) is ambiguous in its reading. Both readings - MEASURE/non-MEASURE - are possible here.[15] (15) shows the same phenomenon. When the quantified NPs are associated with "a subset reading - that is, a partitive reading -", then a MEASURE reading should be provoked. On the other hand, if they are just "encoding a numerical statement of some sort", then there will be no MEASURE reading.

Quite naturally, we might ask why this is possible. They have the same lexical entries under the VP. In actuality, this question should have been asked before we proceeded into section 1. Recall Borer's explanation concerning the two possible readings of the sentence, "*John ran.*"

> " ... [T]urning now to he intransitive motion verbs such as *run*, note that certainly they do not play a delimitation. However, the argument of such a verb, other than being interpreted potentially as an AGENT, can also be interpreted as a MEASURE. Specifically, in *John ran*, *John* could be understood as measuring out the running event. ... " (Borer 1993, p.12)

Along the same line, when we have the lexical entries { built, John, some houses } for the projection of "*John built some houses,*" if we understand the quantified NPs as a subset or a part of a whole, then we can have a MEASURE reading, while ,if we understand them in the other way, then we have a non-MEASURE reading. To derive (a) certain aspectual role(s) from the same lexical entries is clearly up to the speaker's state of mind or understanding of the event. Borer's work should be on this basic implicit assumption.

Thirdly, Enc's (1991) Partitive Case Hypothesis doesn't fit with the English Case system. In order to show a clear difference between specifics and non-specifics and to support her argument for different structures for the two kinds of direct NP objects, Borer depends on two independent pieces of evidence. One is the evidence from Turkish observed by Enc (1991), where "specifics are overtly marked as Accusatives, but non-specifics are unmarked for any Case." In Turkish, "non-specific NPs which remain within the nuclear

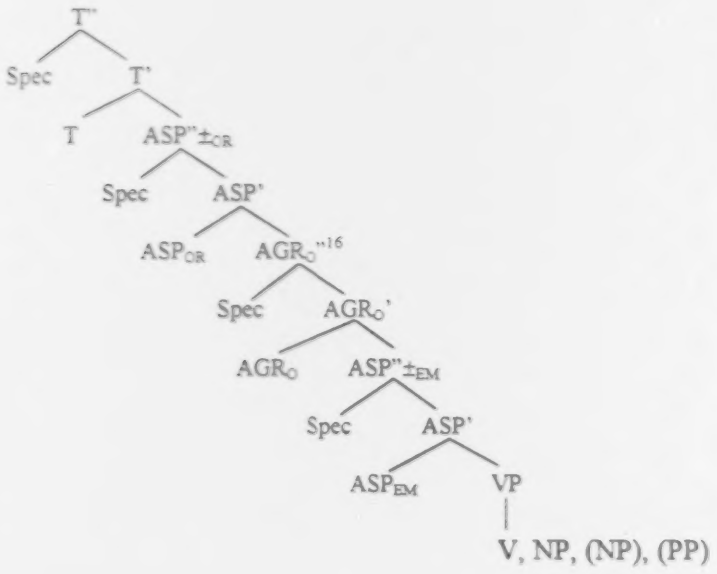
scope incorporate into the V, forming a complex verb", which is clearly not the case for English.

The other piece of evidence is from German and Finnish in which the Case distinction between specifics and non-specifics is realized as a distinction between Accusative Case and Partitive Case. The evidence from German and Finnish leads her to set up another functional projection, FP, within a nuclear scope. The Case which will be assigned in the Spec of the FP is a Partitive Case. The issue on whether the Partitive Case is applicable to the English indefinite / non-specific direct NP objects is quite open for more research. In addition, according to our argument, the distinction between definite / specific and indefinite / non-specific NPs is unnecessary.

3. A New Structure for the Event Aspectual Syntax

Arguing against some problems of Borer's theory, we have shown the following: first, the $ASP_{EM}P$ should not have two independent functions such as Case and Aspectual role assignment. It should have the same number or same kind of function with the $ASP_{OR}P$. Therefore, the split of the functions possessed by the $ASP_{EM}P$ is needed. Second, the directional PPs such as '*in the* park,' and '*to the* park' are not different in their syntactic position. They own the same syntactic position. The only difference is whether or not they help to determine an aspectual role or not. Third, the structural difference between definite / specific / quantified NPs and indefinite / non-specific NPs is not necessary for English. That is, in English, we don't need to have three positions for Case assignment. Two is enough. The difference concerning MEASURE / non-MEASURE reading can be derivable from the difference of aspectual roles of a whole predicate.
The new structure is presented in the following:

(16) New Structure



The conditions needed for the operation are as follows:

1. Arguments under the VP are unordered and unhierarchical.
2. Aspectual roles are predicted from the compositional meaning of a whole predicate before projection of a structure.[17]
3. Every proposition must have at least one fully projected aspectual maximal category. (Borer 1993, p.14)
4. MEASURE includes Specificity, too. However, [±MEASURE] is determined by the whole compositional meaning of the entire predicate.
5. Unnecessary maximal projections are not projected. (Grimshaw 1995)
6. Bottom derivation is pursued.
7. Derivation stops when it gets Case.
8. Shortest Movement is required.
9. Functional projections whose properties are already saturated are invisible for the following derivation.

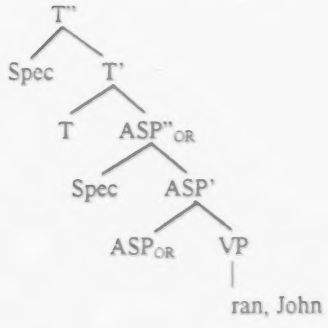
Based on the conditions and the structure above, let us consider how the new system explains the data. The data we have discussed so far are repeated in the following.

(17) a. John ran.
b. Kim ate the apple.
c. Tom knows the answer.
d. Tom built houses.
e. Kim built some houses / many houses.

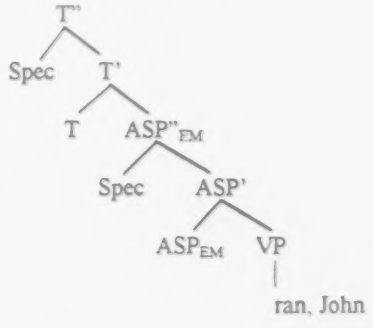
Concerning (17a), "*John ran.*", which is possible for both reading, the new structures will be as follows:

(18) *John ran.*

a. Unergative Reading

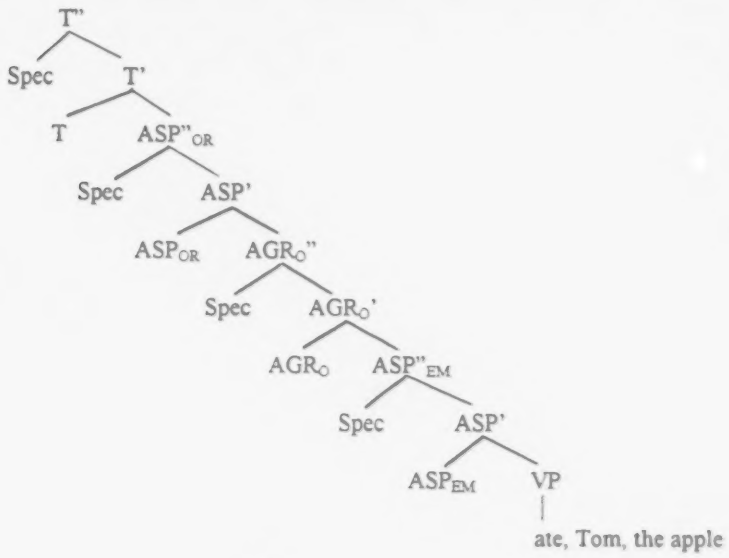


b. Unaccusative Reading



(17b), "*John ate the apple.*", might have two possible variations according to which argument will move first. However, there will be no difference in aspectual roles.

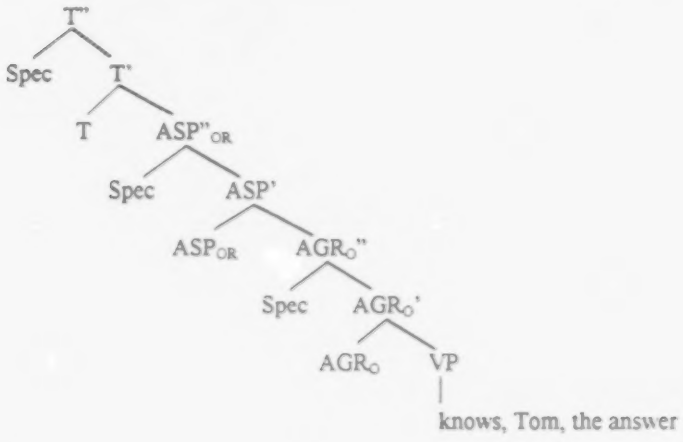
(19) *Tom ate the apple / The apple ate Tom.*



Consider the derivation in detail. Because there are two arguments led by the verb, two Case-related functional positions will be expected to project. When the speaker picks up '*the apple*' first for movement, the other argument '*Tom*' is automatically determined to be a subject. With the help of the vague syntactic arrangement of arguments, the compositional meaning of the whole predicate is derived and aspectual roles become available. Then, syntactic functional/aspectual projection follows. (Recall there is a possibility in which aspectual role(s) for a sentence led by transitives might not be the same according to which argument moves first to the Spec of $ASP_{EM}P$. This is discussed briefly in footnote 17). '*the apple*' moves to the Spec of the $ASP_{EM}P$[18] and there MEASURE reading is activated. Next, '*the apple*' moves further to get Case. The shortest target is the Spec of the AGR_OP. And there, it receives the Accusative Case. The derivation of '*the apple*' ends there, because the derivation has earned Case. When another argument '*Tom*' moves next, the available positions are [Spec, $ASP_{OR}P$] and [SPEC, TP] because the other functional projections such as the $ASP_{EM}P$ and the AGR_OP are invisible any more. By the shortest move condition, '*Tom*' moves to the Spec of the $ASP_{OR}P$ and then to the Spec of the TP.

(17c) , "*Tom knows the answer,*" will have the following structure.

(20) *Tom knows the answer.*



There will be no $ASP_{EM}P$, because the entire predicate does not imply the EM reading. However, the direct object '*the answer*' needs Accusative Case. So it moves to and receives Case in the Spec of the AGR_OP.

We might have a question about the definiteness of the argument '*the answer*." Though the NP has a definite article and the whole predicate allows the definite/specific reading, it is not enough to be a MEASURE, because the whole predicate is usually assumed to be that of STATE. The direct object *the answer* does not measure out an event, nor is the event measured or delimited in any way. To fulfill the requirement saying there should be at least one fully projected aspectual maximal category, the $ASP_{OR}P$ should appear.

The derivation of (17d), "*Tom built houses*" is almost the same with that of (17c) "*Tom knows the answer.*"
Concerning (17e) , *Kim built some houses / many houses* , whether or not the ASPEMP will be projected is entirely dependent on the speaker's understanding of the event or 'state of mind. If the quantificational modifiers such as '*some*', and '*many*' are understood by the speaker in such a way as to express a subset reading or a partitive reading as is often called, then, the structure will have the $ASP_{EM}P$ projected and the MEASURE reading will be activated. If the reading of them is otherwise, then the structure will have no $ASP_{EM}P$. However in either case, the AGR_OP will be there.

4. Conclusion

In this paper, we have pointed out some problems of Borer's (1993) theory on the event aspectual syntax which is mainly to explain the alternation between uneragtives and unaccusatives. To solve them, we have suggested another aspectual functional structure, in which we split Borer's $ASP_{EM}P$ into two independent functional projections one of

which is truly syntactic functional projection, AGR_OP, and the other is an aspectual functional projection, $ASP_{EM}P$. By splitting the original ASPEMP into two with a distinct function, we could attain not only the consistency in terms of the assignment of aspectual function between aspectual functional projections such as ASPEMP and ASPORP, but also consistency in terms of the number of the function each of the projection is doing among all functional projections

We have argued against Enc's (1991) Partitive Case Hypothesis and argued also against some observations on the different syntactic behavior between definite/specific NP objects and indefinite/non-specific NP objects collected from German and Finnish.

We have discussed that speaker's understanding of the event (or state of mind) is crucial to decide which aspectual roles are available when an entire predicate is given. Concerning the mechanism through which aspectual roles are driven from the entire predicate , and concerning how much are we dependent on syntax (or at least on the arrangement of lexical entries) in order to derive aspectual roles , much more work seems to be needed.

NOTES

1. As numerous studies have observed, "the unaccusative/unergative alternation is not nearly as stable and lexical-entry dependent as it is occasionally presented." "The typical unergative verbs such as *sprongen* 'jump' in Dutch and *correre* 'run' in Italian, which take an unergative auxiliary (*hebben* and *avere* respectively) and which do not allow *ne*-cliticization, exhibit the full range of UNACCUSATIVE characteristics, selecting *zijn* and *essere* and allowing *ne*-cliticization if a PP specifying a terminal point of the motion is added. Dutch impersonal passive, typically restricted to unergatives, can occur with the unaccusative verbs *vallen* 'fall' and *stronken* 'stink', providing an intention is ascribed to the argument (fall on purpose, stink on purpose). Finally, the Hebrew verbs *naval* 'wilt' and *ne'elam* disappear' (among many others) can behave both as unaccusatives, in allowing a possessor dative, and as unergatives, in allowing a reflexive dative." (Borer 1993, p 2).
For more detailed data, refer to Borer (ibid., pp.1-2).

2. Though many linguists on the lexical driven-approach are different in their accounts, they share an effort to "deterministically project a grammatical level of representation based on the properties of individual lexical entries."(ibid., p. 1)

3. The argument(s) of '*derive* ' and 'wilt' will be introduced as follows(ibid., p.8):

(a) V^{MAX}
|
derive, NP, NP

(b) V^{MAX}
|
wilt, NP

4. Tenny argues that unlike the other directional PPs, the directional PP such as '*to the park*' which would delimit the event by referring to the property of the MEASURE is an indirect argument. This position is shared by Hoekstra and Mulder (1990) as well as Borer (1993).

5. " I will further assume that all adjunct PPs are projected outside the lexical VP, adjoined to aspectual nodes. ... [T]he PP in (3b) is an argument, and I will assume that it is dominated by the lexical V projection." (Borer 1993, p. 13)

6. Therefore, we can say that in actuality, the structural difference shown in (2) is deducible from the condition (4).

7. Concerning the assignment or licensing of the aspectual role of delimitedness/ Event Measure in '*John ran to the* park' and concerning which element among ***John*** , **to the park** , **PRO**, or **some other constituent** will move to the Spec of the lower functional projection, $ASP_{EM}P$, we will show the detailed derivation later in Khym & Kookiattikoon (forthcoming). Especially concerning which element moves to the Spec of the ASP_{EM} to get the aspectual role, we will argue against Ritter and Rosen's (1997: forthcoming) approach in which *PRO* moves, and also against Levin and Rappaport Hovav (1995) in which *John* moves..

8. Concerning the relationship between a MEASURE and a DELIMITER, Borer mentions that " the existence of a DELIMITER implies the existence of a MEASURE, but the reverse implication does not hold." (Borer (1993, p. 12)

9. We showed in (8b) that the projection of the Spec of the $ASP\text{-}_{EM}P$ for ergative intransitives need not be optional.

10. Concerning the movement of non-specific direct objects to the Spec of the ASPP , Borer gives up her assumption that the assignment of both aspectual role and Accusative Case is dealt with in the Spec of the $ASP_{EM}P$ simultaneously. Instead, she introduces another functional projection, FP, which is located above the VP but below the $ASP_{EM}P$, which is responsible only for Partitive Case assignment for indefinites/non-specifics. However, still we have to have the $ASP\text{-}_{EM}P$ over the VP with the Spec unprojected. Though her new FP can explain the data from German, Finnish, and Turkish non-specific objects, still we cannot find any plausible explanation concerning the problem we are now discussing in this section. In addition, with that assumption, the whole shape of the theory gets complexed.

Why she insists on the ASPP with two separable functions such as Case and Aspectual role(s) is because her framework is entirely based on the aspectual role of MEASURE, whereby she could easily explain the alternation between unergatives and unaccusatives and whereby she could also easily include the cases of transitives within the framework. However, we still lack justification on the two functions of one functional aspectual projection. In section 3, we will discuss this problem in detail.

11. The two other functional projections such as TP and FP can not be aspectual projections, since they are only responsible for the Case assignment, not for the aspectual role assignment. However, one might say that unlike the TP which is certainly non-aspectual, the FP might be considered as an aspectual projection, since the FP causes the ASP-$_{EM}$P and supports some semantic information for non-specific/indefinite reading. In this respect, there seems not be a clear-cut distinction between the FP and the other two aspectual projections and in addition, there seems to be some difference between the TP and the FP themselves.

12. The Case concerned with this position is Accusative Case.

13. The Case concerned with this position is Partitive Case. Refer to de Hoop (1992) for more detailed argument concerning the distinction between Accusative Case and Partitive Case.

14. Quantifiers giving rise to a specific partitive interpretation and '*every*'.

15. We have discussed this issue in section 1.

16. AGR$_O$P is only responsible for Accusative Case assignment as it is in Chomsky (1993).

17. Concerning exactly when we come to know from the lexical lists if there is a certain aspectual role , there should be more exploration. However, we might havean argument for this from the Economy Principle. Consider the following sentence:

a. John built many houses.

As we have discussed in section2.3., this sentence is ambiguous in its reading. If the quantifier 'many' is associated with a subset reading - or with a partitive reading as it is sometimes called-, then the object NP, 'many houses', can function as a MEASURE. On the other hand, if it just "encodes a numerical statement of some sort", no accomplishment seems to be implied. That is, no MEASURE is expected. However, we should not miss the fact that both readings are derived from the exactly same lexical entries as far as 'many houses' is picked up for movement first. The lexical entries under the VP will be as follows:

b. VP
   |
   {built, John, many houses}

In order for the two readings to be derived mainly from the same lexical entries {many houses}, together with minor others here such as {built, John}, we have to have some pre-determined meaning of the quantifier *many* before we project maximal categories into the syntax thereafter. Otherwise, we will have unnecessary or unwanted , but still

legitimate aspectual nodes, which is not an economical derivation. If we take another possible output into consideration such as 'Many houses built John," , then the situation will get more complicated and the global economy of derivation will surely cause complexity of computation. If this argument is correct, then Economy Principle will say more for our argument here. Therefore, we can say that aspectual roles should be derived before or at least at the same time when the first argument to move is picked up by the speaker.

18. In our system, ASP-$_{EM}$P is not possible. If the MEASURE reading is not available from the entire predicate, then, the ASP$_{EM}$P is not projected.

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AGAINST IP-ADJUNCTION SCRAMBLING

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Abstract: As an optional movement, "scrambling" in Japanese has been one of the major obstacles to the Minimalist Program, in which movements occur only when necessary. Miyagawa (1996), in his attempt to accommodate this phenomena to the MP, argues that VP-adjunction scrambling should be analyzed as base-generated constructions and suggests that IP-adjunction scrambling is motivated by some special element like Focus. This paper argues that if we make a natural extension of the categories which can assume strong features, the IP-adjunction scrambling phenomena, too, can be accounted for in the MP without stipulating any special element. This study implies that except that a lexical category V can bear a strong D-feature, nothing is special about Japanese phrase structure.

1. Introduction[1]

In this paper, I will argue that if we make a natural extension of the categories which can assume strong features, the IP-adjunction scrambling phenomena can be accounted for in the Minimalist Program, specifically the Agr-less feature checking theory (Chomsky 1995, Ura 1996). As far as we are successful, we can maintain that there will be no optional movement in Japanese, a welcome result for the Minimalist Program. We will use reciprocal binding and Case marker drop as our main tools of analysis, since they can be used to show if some element is in an A or A-bar position. By these diagnoses, it will be shown clearly that in Japanese there is a base-generated OSV order as well as a derived OSV order by fronting the object to focus position.

2. Analysis

Structural Ambiguity of IP-Adjunction. IP-adjunction scrambling in Japanese is illustrated in (1).

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(1) a. John-ga Mary-o home-ta.
J.-NOM M.-ACC praise-past
'John praised Mary.'

b. Mary-o John-ga home-ta.
M.-ACC J.-NOM praise-PAST
'John praised Mary.' (= (1a))

Japanese is believed to have a basic word order of SOV. So under these common assumptions, (1b) will be derived from (1a) by adjoining the object *Mary-o* to IP.

As is often pointed out, however, this IP-adjoined position is associated with both A and A-bar properties (see Saito 1992, Tada 1993, Miyagawa 1997). For example, see (3a):

(2) 'IP-adjoined' position is either A- or A'-position (Saito 1992, Tada 1993, Miyagawa 1997)

(3) a. [John-to Mary]-o$_i$ otagai-ga$_i$ home-ta.
[J.-and M.]-ACC each other-NOM praise-PAST
'John and Mary, each other praised.'

Although Miyagawa (1997) considers this to be unacceptable, (3a) is completely acceptable to most Japanese.[2] If this is the case, it shows that what we call IP-adjoined position can be an A-position in this case and bind the subject to its right, which is a reciprocal anaphor *otagai-ga*. The scrambled object *John-to Mary-o* is in fact in an A-position. This will be confirmed by reconstructing (3a) to (3b).

(3) b. *Otagai-ga$_i$ [John-to Mary]-o$_i$ home-ta.
Each other-NOM [J.-and M.]-ACC praise-PAST
'Each other praised John and Mary.'

In (3b), the object appears in what we call its 'original' position and nevertheless is completely unacceptable.[3]

On the other hand, the IP-adjoined position is sometimes considered to be an A-bar position. See the pair of (4):

(4) a. [John-to Mary]-ga$_i$ otagai-o$_i$ home-ta.
[J.-and M.]-NOM each other-ACC praise-PAST
'John and Mary praised each other.'

otagai-o in (4a) is bound by the subject *[John-to Mary]-ga*. This relation is maintained even if the object appears in the sentence initial position as in (4b).

(4) b. Otagai-o$_i$ [John-to Mary]-ga$_i$ home-ta.
Each other-ACC [J.-and M.]-NOM praise-PAST
'Each other, John and Mary praised.'

Hence, in (4b) the object *otagai-o* must be in an A-bar position and has to be reconstructed as in (4a) by the time Binding theory will apply. [4]

Now we are in a very peculiar situation: (3a) and (4a) seem to indicate that Japanese has both OSV and SOV as its basic word order. Where does this ambiguity come from in the Minimalist Program? I would like to show in the following discussion that this fact will be accounted for if we make a natural extension of categories to which strong features will be assigned.

Before we proceed, let us make clear the definitions of A/A-bar positions in the Minimalist framework. I will adopt the definitions of Ura (1993). See (5):

(5) A narrowly L-related position is always an A-position. A broadly L-related position counts as an A-position only if it is actually L-related; otherwise, it is an A-bar position. (Ura 1993: 257)

The notion of 'actually L-related' is defined as in (6):

(6) A position is actually L-related if feature-checking actually takes place between that position and some L-head. (ibid.)

To put it informally, A-positions are complement and specifier positions where some theta-role is assigned and the positions with which some feature-checking takes place.

Overt Object Shift in Japanese. There is an evidence that the object in Japanese overtly moves to its feature-checking position. VP-adverbs such as *kossori*, which means 'secretly', can appear between the object and the verb as in (7):

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(7) John-ga Mary-o kossori home-ta.
J.-NOM M.-ACC secretly praise-PAST
'John praised Mary secretly.'

This clearly indicates that there is an overt object shift in Japanese, which in turn is the evidence of the existence of strong [D] feature in this language.[5]

Usually this strong feature is considered to be assigned to *v*. This assumption needs some rethinking, since there are some suggestions in the literature proposing that lexical categories, too, can be assigned strong features. For example, see Kikuchi (1996). Chomsky (1995) suggests that strong features will be restricted to T, *v*, and C as in (8):

(8) Only T, *v*, and C can be strong. (cf.. Chomsky 1995: 232)

Since these are all in a sense verbal categories, it will be natural to think of any verbal category can assume a strong feature as in (9):

(9) Only verbal categories may assume a strong feature.

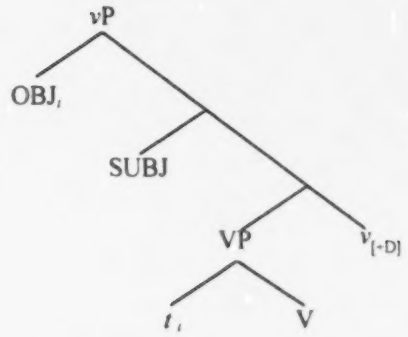
Suppose this is a right move and assume (10):

(10) V, as well as T, *v*, and C, can be strong.

Then the strong D feature for the object checking can be assigned to V, as well as *v*.[6] Of course, the strong feature can be assigned to both categories at the same time. In that case, however, the derivation will necessarily crash, since there are not enough DPs in the numeration. In addition, if there are two strong Ds in the numeration, it will not be the same one with just one strong D, hence we need not consider these cases.

First, let us consider the derivation when the strong [D] feature is assigned to *v*. see (11):

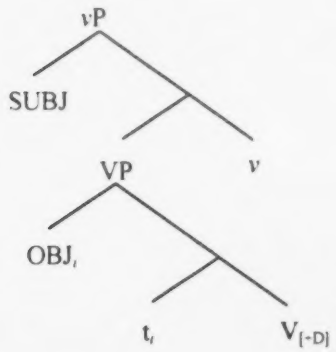
(11)



V merges with OBJ and projects to VP. This VP merges with *v* with a strong [D] feature. The next step has two possibilities: either the merger of SUBJ or the raising of OBJ. Since the merge is more economical than the move, the former will be selected as the next operation. After this, OBJ will be raised to the Spec of *v*P and the strong [D] will be checked off. [7] This is the structure for OSV with O in its A-position.

Let us look at what the derivation will be like if the strong feature is assigned to large V. see (12):

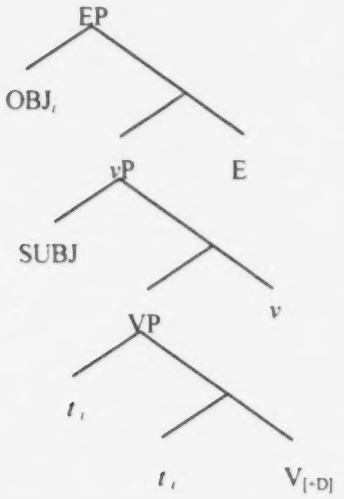
(12)



First, the object and V merge and make a VP. Before this VP is merged with *v*, the strong D of large V must be checked off, so OBJ will be raised to the Spec position and checks off the [D] feature. Next, small *v* and VP merge and SUBJ is adjoined to this structure. This is the structure for SOV.

Finally, as is suggested by Miyagawa (1997), in Japanese an element can receive focus and will be raised to a higher position. Without further discussion, we will assume that the focus feature will be checked off by an element E (E is an abbreviation for emphasis). This E will be merged with *v*P. Suppose that in (14) the object has received focus. Then the object will be raised to the Spec of EP and the focus feature will be checked off. This is a structure for (6b), in which the sentence initial object is in an A-bar position. [8]

(13)



3. Predictions

If we are on the right track, we will be able to give some interesting predictions about reciprocal binding in embedded contexts and Case marker drop.

Reciprocal Binding in Embedded Contexts. First let us see the reciprocal binding. According to our analysis, there is what we call 'base-generated' OSV word order (11), in which the object can bind the subject as in (5a), repeated here as (14):

(14) [John-to Mary]-o$_i$ otagai-ga$_i$ home-ta. (= (5a))
J.-and M.-ACC each other-NOM praise-PAST
'John and Mary, each other praised.'

In (12), the subject will bind the object and this is the structure for (4a), repeated here as (15):

(15) [John-to Mary]-ga$_i$ otagai-o$_i$ home-ta. (= (6a))
J.-and M.-NOM each other-ACC praise-PAST
'John and Mary praised each other.'

The object may assume emphasis or focus, and can be raised to the Spec of EP to check off [focus] feature. (4b), repeated here as (16), has such a structure.

(16) Otagai-o$_i$ [John-to Mary]-ga$_i$ home-ta. (= (4b))
Each other-ACC J.-and M.-NOM praise-PAST
'Each other, John and Mary praised.'

Now consider reciprocal anaphors in embedded contexts. In (17), the reciprocal *otagai-o* appears as the object of the embedded clause, and takes the subject in the matrix clause as its antecedent. This is almost unacceptable.

(17) ?*[John-to Mary]-ga$_i$ [[Taro-to Hanako]-ga otagai-o$_i$ home-ta]-to itta.
[J.-and M.]-NOM [[T.-and H.]-NOM each other-ACC praise-PAST-comp] say-PAST
'John and Mary said that Taro and Hanako praised each other.'

It is not the case that the reciprocal cannot cross the clause boundary and take the antecedent from the matrix. See (18):

(18) ?[John-to Mary]-ga$_i$ [otagai-ga$_i$ [Taro-to Hanako]-o home-ta]-to itta.
[J.-and M.]-nom [each other-nom [T.-and H.]-acc praise-past]-comp say-past
'John and Mary said that each other praised Taro and Hanako.'

(18), in which the embedded subject is bound by the matrix subject, is more or less acceptable, and far better than (17).

Now consider what will happen if the reciprocal object *otagai-o* in (17) appears before the embedded subject as in (19)?

(19) ?[John-to Mary]-ga$_i$ [otagai-o$_i$ [Taro-to Hanako]-ga home-ta]-to itta.
[J.-and M.]-NOM [each other-ACC [T.-and H.]-NOM praise-PAST]-comp say-PAST
'John and Mary said that each other, Taro and Hanako praised.'

If our analysis is correct and the object can be in an A-position, then we predict that (19) will have the same status concerning binding as (18), rather than (17). This prediction is borne out.

Case Marker Drop. Next, consider Case marker drop. (20a) is an instance of long distance scrambling.[9]

(20) a. Mary-o$_i$ Bill-ga [John-ga t_i home-ta]-to itta-yo.[10]
M.-ACC B.-NOM [J.-NOM praise-PAST]-comp say-PAST-PARTICLE
'Mary, Bill said that John praised.'

Whatever the basic word order is, it is clear that the embedded object *Mary-o* is displaced from its Case-feature checking position. Therefore, according to our definition of A/A-bar position, the object is in an A-bar position and in this case, the accusative Case marker *-o* never drops. See (20b):

(20) b. *Mary$_i$-ϕ Bill-ga [John-ga t_i home-ta]-to itta-yo.
M. B.-NOM [J.-NOM praise-PAST]-comp say-PAST-PARTICLE
'Mary, Bill said that John praised.' (= (20a))

On the other hand, the accusative Case marker can be dropped from the object in its A-position. Compare the sentences in (21):

(21) a. [John-to Mary]-ga, otagai-o, home-ta-yo.
[J.-and M.]-NOM each other-ACC praise-PAST-PARTICLE
'John and Mary praised each other.'

b. ?[John-to Mary]-ga, otagai$_i$-ϕ home-ta-yo.
[J.-and M.]-NOM each other praise-PAST-PARTICLE
'John and Mary praised each other.' (= (21a))

Although (21b) is not completely acceptable, it still is far better than (20b).

Now we can draw the following descriptive generalization from the discussion about the sentences in (20) and (21). That is, the accusative Case-marker can drop from the object in its A-position, while it cannot drop from the object in its A-bar position.

With this generalization in mind, consider the sentences in (22):

(22) a. Otagai-o$_i$ [John-to Mary]-ga, home-ta-yo.
Each other-ACC [J.-and M.]-NOM praise-PAST-PARTICLE
'Each other, John and Mary praised.'

b. [John-to Mary]-o, otagai-ga, home-ta-yo.
[J.-and M.]-ACC each other-NOM praise-PAST-PARTICLE
'John and Mary, each other praised.'

If our analysis is correct, the object in (22a) *otagai-o* is in an A-bar position, while that in (22b) *[John-to Mary]-o* is in an A-position. Then we predict that these two sentences will show different behaviors with respect to Case marker drop, and this prediction is borne out, as can be seen in (23):

(23) a. *Otagai-ϕ_i [John-to Mary]-ga, home-ta-yo.
Each other [J.-and M.]-NOM praise-PAST-PARTICLE
'Each other, John and Mary praised.' (= (22a))

b. ?[John-to Mary]-ϕ_i otagai-ga, home-ta-yo.
[J.-and M.] each other-NOM praise-PAST-PARTICLE
'John and Mary, each other praised.' (= (22b))

(23a) is never acceptable. On the other hand, although (23b) is not a perfect sentence to the native speaker's ear, it is at least as acceptable as (21b).

4. Conclusion and Implications

We have shown in this paper that if we make a natural extension of the categories which can assume strong features, then we can explain the structural ambiguity of IP adjunction scrambling in the Minimalist framework. Specifically, we proposed that V, as well as *v*, can be assigned a strong [D] feature. We have seen that our analysis has made correct predictions for reciprocal binding in embedded context and case marker drop.

Although we have not dealt with other scrambling phenomena, mainly because of the space limitations, our proposal can easily be extended to them. That is, we can account for the fact that what we call s-scrambling, that is, the free word order phenomenon in ditransitive sentences, shows only A-properties while l-scrambling is associated only with A-bar properties.

Notice that though our main contention is almost the same as Miyagawa (1997), his analysis has a few problems. First, his judgment of (3a) is not consistent with that of

most Japanese. Second, he uses the Agr-based theory for his analysis. [11] As Chomsky says, Agr is conceptually undesirable in that it has no theory-external reasons for its presence. Moreover, at least in Japanese, its existence is dubious since it has no morphological reflection in this language.

NOTES

[1] This is a slightly revised version of my paper read at the 1997 LSA annual meeting at Chicago, January 2, 1997. I would like to thank the audience there for their comments, especially Shigeru Miyagawa. For comments and discussions on earlier versions of this article and/or native-speaker judgments, I owe a special debt of gratitude to the following people: Maki Asano, Samuel D. Epstein, Minoru Fukuda, Erich Groat, Youngjun Jang, Toshitaka Kodoh, Akira Kikuchi, Susumu Kuno, Ken Nakatani, Masao Ochi, John O'Neil, Noriaki Yusa. Last but not least, I would like to express my deepest acknowledgment to Hidekazu Suzuki for his comments and encouragement.

[2] There may be a dialectal difference about this judgement. I have only one native speaker who agrees with Miyagawa 1997, and she is from the Osaka district.

[3] Remember that only those elements in an A-position can be a binder for the Binding Theory, while those in an A-bar position can never be. Therefore, we will be able to check if some element is in an A or A-bar position by using sentences containing anaphors. As for no full reconstruction, see Lasnik 1993.

[4] There is a controversy as to the level at which Binding Theory will apply. It is

clear, however, that the sentences must have almost the same structure at LF. Hence without further discussion, we will assume Binding Theory will apply to the LF structure.

[5] VP-adverbs merge with any projection of *v* or V. See Kikuchi 1996.

[6] V almost corresponds to a regular verb, while *v* is AGRoP in the former framework. As for the assumption (10), Miyagawa (pc) suggested one problem about it.: True, with this assumption, there will be no optional movement in Japanese, but it has still optional assignment of strong features. Then we have to work out where this optionality comes from. I would like to leave this problem for future research.

[7] Notice that the strong feature is checked off within its projection, hence there will be no violation of economy principles. Cf. Chomsky (1995: 234):"... the strong feature merged at the root must be eliminated before it becomes part of a larger structure by further operation."

[8] My suspicion is that E will be associated with T, which will explain why there is no subject emphasis or nominative Case marker drop. Cf. Kuno (1973).

[9] This is the L-scrambling of Tada (1993).

[10] We have added the sentence-final particle *-yo* to this sentence, because it makes sentences with Case marker drop more natural. See Masunaga (1988).

[11] This is in a sense inevitable, since at that time there was no Agr-less feature checking theory.

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SYLLABLE STRUCTURE AND EXTERNAL EVIDENCE

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Abstract: To determine what psycholinguistic evidence (or external evidence) such as slips of the tongue, monosyllabic word blends, and novel word games reveals about syllable structure, this investigation focuses on psycholinguistic research on the English and German syllable. English and German in particular provide a good testing ground for the evaluation of external evidence because much external evidence has been interpreted as revealing the internal organization of the syllable for both languages. After a review of the external evidence, I argue that psycholinguistic evidence does not reveal syllable structure but rather how the linguistic processor organizes syllable-internal segments.

Psycholinguistic Evidence for the Onset and Rime

Psycholinguistic evidence seems to suggest a hierarchical syllable structure with an onset/rime division (MacKay 1972, Fallows 1981, Mohanan 1982;1986, Treiman 1983;1986;1988;1989, Berg 1989, Yaniv, Meyer, & Gordon 1990, Levitt, Healy & Fendrich 1991, Fowler, Treiman, & Gross 1993, Treiman, Fowler, Gross, & Berch 1995). Summing up psycholinguistic evidence for syllable structure, Levitt, Healy, & Fendrich (1991:339) state that "most of the evidence for the hierarchical division of the syllable into an onset and rime, and possibly into a nucleus and coda, comes from studies that present stimuli auditorily and require subjects to focus closely on phonological structure of the stimuli in order to play novel word games or perform segment interchanges." Although some psycholinguistic evidence reveals the peak and coda as subrime units, this investigation focuses primarily on the more accepted onset/rime structures. The syllable as a hierarchical structure including the peak and coda is given below.

S

onset rime

P coda

Psycholinguistic Evidence for the Onset/Rime Division in German Syllables

MacKay (1972) examined German speech errors that involved the blending of two words with roughly the same meaning. Such blends are referred to as synonymic intrusions. Working from a data base consisting of synonymic intrusions, MacKay (1972:215) discovered that most of the "breaks within syllables immediately preceded the vowel" while few breaks immediately followed the peak. Concerning the behavior of vowels and post vocalic consonants, MacKay (1972:219) states that "final consonant(s) must form another group with the vowel since breaks rarely fell between final consonant(s) and the vowel."

Berg (1989) supports MacKay's (1972) findings. Also focusing on speech errors in German, Berg (1989:205) finds onsets were switched with onsets, suggesting an onset unit, and rimes were switched with rimes, suggesting a rime structure. Berg (1989:250) finds that "initial tongue slips occur almost five times as often as final errors". In sentence 1 below, an example of an onset-onset slip is offered. In 2, a coda-coda slip is given.

1. Ich befürchte, wir winden - finden nichts.
   I'm afraid we won't find anything.
2. Ein Schluck. Stock- Stop!
   A sip. Stop! (my translation)

Important about these findings is that speech errors occur more predictably after syllable initial consonants than before syllable final consonants. Syllable final consonants presumably do not break off from the rest of the syllable as readily because they belong to the subsyllabic structure, the rime. Syllable initial consonants break off more often in speech errors because they constitute an independent unit, separate from other subsyllabic structures.

Further speech error evidence for the independence of the onset and rime in German speech is offered below. Berg (1989) finds that the syllable onset rarely functions with the peak in cluster exchanges. Sentence 3 below exemplifies a CV tongue slip and sentence 4 demonstrates a VC slip.

3. Wir nehmen den höchsten Hörer an. -- den nächsten Hörer.
   We put the next listener on the line.

4. Es ist nicht einfach, ihn wieder ins zweite Glück-Glied zurückzubefördern.
   It is not easy to move him from his top position one step back down the ladder.

In 3, the CV string *nä* - [ne:-] was replaced by the CV string *hö* - [hø-]. In 4, the VC *-ied* [-it] was replaced by the VC-*ück* [-yk]. Statistically more VC slips occurred than CV errors, suggesting that the VC combination is more cohesive than the CV combination. This evidence argues for the VC to constitute a unit rather than the CV because VC strings were found to pattern together more often than CV combinations.

Psycholinguistic Evidence for the Onset/Rime Division in English Syllables

In a series of experiments and in reports on psycholinguistic evidence involving word blends and novel word games, Treiman (1983;1984;1986;1988;1989;1995) examines the behavior of segments within the English syllable. In blend manipulation tasks, subjects tend to blend nonsense words according to the onset/rime division. In addition, novel word games were more easily and more accurately learned if the rules corresponded to the onset/rime structures.

In nonsense word blend tasks, Treiman (1988) had subjects combine two syllables into one response by joining part of the one syllable that was presented with part of another syllable. For example, subjects had to combine the two syllables /klum/ and /swauš/ into one response. The blending of the onset /kl-/ of syllable /klum/ with the peak /-auš/ of syllable /swauš/, was considered an O/PC (onset/peak-coda) response. Relevant to syllable structure, O/PC responses suggest that the peak and coda form a unit separate from the onset. The blending of the onset and peak of one syllable with the coda of another syllable was recorded as an OP/C response. An OP/C blend of the /klum/-/swauš/ example would be /kluš/. Instructions for the word blending task were to combine the two nonsense syllables into one by taking "part of the first syllable, starting from the beginning, followed by part of the second syllable to form one new syllable" (Treiman 1988:227). For each subject, the order of the stimulus pairs was chosen randomly. Subjects preferred O/PC blends over combinations that broke up the onset or rime structures such as OP/C blends.

In teaching novel word games, Treiman (1983:49) finds that subjects "preferred rules that referred to" the onset and rime structures "over rules that referred to other units." Furthermore, they learned rules that kept the onset and rime intact more easily than rules that divided these units" (p.49). To learn about the behavior of prevocalic consonants, Treiman (1983) had subjects add the onset of a CVC form to /æz/, the onset of a CCVC form to /-æz/ and add the first phoneme of the CCVC form to /-æz/. Specifically,

"rule A states /-æz/ is added to the onset of the stimulus and that the remainder of the stimulus follows" while "rule B states that /-æz/ is added to the first phoneme of the stimulus and that the remainder of the stimulus follows" (p.54). Examples of the CVC and CCVC forms are given below.

CCVC: Rule A	CCVC:Rule B	CVC: A or B
skef --> æz -->/skæz/ /ef/	skef--> æz -->/sæz/ /kef/	klg -->æz-->/kæz/ /lg/
glɔs --> æz -->/glæz/ /ɔs /	glɔs --> æz -->/gæz/ / lɔs /	tɛp --> æz--> /tæz/ ɛp/
tw ʌl --> æz -->/twæz/ /ʌl/	twʌl--> æz -->/tæz/ /w ʌl/	nol --> æz-->/næz/ʃʊl/

For the CVC syllables both rules yielded the same results. Of interest was the behavior of the rule on CCVC forms. Subjects generalized the rule that divides the CVC string into C/VC to apply to CC/VC. Subjects preferred "the rule that refers to the onset over the rule that refers to just the initial consonant" (Treiman 1983:56).

Treiman (1983) carries out further experiments testing for the possibility of other subsyllabic units that "are involved in the processing of speech" (p.49). Other possible subsyllabic units targeted by manipulation tasks included: C/VC, CV/C, CV/CC, CC/VCC, CCV/CC, and CCVC/C. Subjects tended to learn rules more accurately and quickly that divided the syllables in C/VC or CC/VCC structures, suggesting a hierarchical onset/rime division of the syllable. Treiman (1983:70) concludes that "the rule that divided the onset was more difficult to learn than the rule that kept the onset intact. In addition, the rules that divided the rime (i.e., the CCV/CC and CCVC/C rules) were more difficult to learn than the CC/VCC rule which kept the rime."

Although in general I accept the results from the series of experiments, I offer a critique of the interpretation of the C/CVC units. An underlying assumption is that CVC of the C/CVC string does not form a unit because the VC string /-æz/ does not replace it. The VC string may not easily replace the CVC string because the units are not of the same shape. A CVC may have replaced the CVC of the C/CVC string more readily, thus suggesting that the initial consonant of a CC cluster may not be closely related to the second consonant of the cluster. Such a result would question the hypothesis that prevocalic segments form a cohesive subsyllabic unit separate from the rest of the syllable.

Another critique concerns the nature of the data. The data reveal that the prevocalic consonants break off from the rest of a monosyllabic form. It is not clear whether subsyllabic structures are revealed by the data or

sublexical/morphemic structures of the form word intial consonants + word remainder are revealed by the data. Davis (1989:211) notes that "evidence from speech errors and word games actually does not support the division of the syllable into onset and rhyme ... because such evidence is based on monosyllabic words." The behavior of speech errors and word games such as Pig Latin in polysyllabic words shows that word initial consonants rather than syllable onsets separate from the remainder of the word, suggesting sublexical structures rather than subsyllabic structures. Drawing on data from Fromkin (1973), Davis (1989:212) offers the following speech errors (Spoonerisms) and data from Pig Latin.

Spoonerisms
helf lemisphere for *left hemisphere*
Yoman Rokobson for *Roman Jakobson*

Word Game: Pig Latin
atinley for *Latin*
iminalcrey for *criminal*

In these Spoonerisms, the initial consonants or prevocalic word onsets switch. The rest of the polysyllabic words remains unaffected by the speech error. In the Pig Latin data, the initial consonant detaches from the word and is added to the end of the word followed by *-ey* . Important here is that much psycholingusitic data relevant to subsyllabic structures is ambiguous. The data may actually reveal sublexical structures of the form word inital consonants + word remainder, rather than the subsyllabic structures, onset and rime.

Moreover, subsyllabic units are not convincingly revealed in monosyllables due to word edge effects. Word edge effects refer to the word initial consonant(s) breaking off from the rest of the word in multisyllabic and presumably monosyllabic forms. To get positive evidence for the onset/rime strucutres, researchers targeted syllables in polysyllabic forms. Fowler et al. (1993) looked at disyllabic nonwords and trisyllabic nonwords to find out if onsets and rimes can be detected in syllables of multisyllabic nonwords. Phoneme shift tasks (visual stimuli) and novel word games (auditory stimuli) were used to target subsyllabic structures in polysyllabic forms. The disyllabic stimuli took the form of C_1VC_2/C_3VC_4. The trisyllables were $C_1V/C_2VC_3/C_4VC_5$. The slash indicates a break between syllables.

In the disyllabic forms, C_2 and C_3 could not be syllabified in the same syllable due to English phonotactic constraints. Stimuli involved two disyllables which were presented visually. The second disyllable contained a capital letter. For example, the stimuli would be *mupnav leFbok*

pronounced as /mʌpnæv/ /lɛfbak/. These stimuli prompted subjects to shift C_2 of the second disyllable to C_2 of the first disyllable resulting in the form /mʌfnæv/. In other shift tasks, C_3 was targeted as well as CV and VC strings. For disyllables, Fowler et al. (1993) found no evidence for subsyllabic onset/rime structures.

In a novel word game and in phoneme shift tasks, Fowler et al. (1993) tested trisyllabic nonsense words of the form $C_1V/C_2VC_3/C_4VC_5$. Slashes indicate syllable breaks due to the phonotactics of English syllabification. Medial syllables were CVC and were always stressed. Onsets, rimes, codas, and CV's were targeted. Onset/rime response times involving the manipulation of the onset/rime structures were faster and more accurate than response times involving the manipulation of codas, and CV strings. The accuracy and speed associated with the manipulation of onsets/rimes in medial syllables suggests the validity of onsets and rimes. Experiments involving disyllables and trisyllables lead Fowler et al. (1993:115) to the conclusion "that both word structure and syllable structure characterize spoken words."

Treiman et al. (1995) also investigated disyllables and trisyllables using novel word games to distinguish between word-based structure and syllable-based structure. Treiman et al. (1995:132), incorporating Fowler et al. (1993) conclude "that both syllable structure and word structure play a role in the processing of spoken words." Important about Fowler et al. (1993) and Treiman et al. (1995) is that they offer evidence for the validity of onset/rime as subsyllabic units. The nature of these units, however, is misinterpreted as syllable structure.

Psycholinguistic Evidence and Linguistic Processing

In this section I argue that the external evidence reviewed in this investigation 1) reveals how the processor organizes intrasyllabic constituents and 2) is not directly relevant to the representation of knowledge of intrasyllabic organization. First, external evidence such as speech errors is shown to be directly relevant to the representation of processing structures involved in the production and perception of the subsyllable. Shattuck-Hufnagel (1987:17) states "most models of the speech production planning process assume that the word or lexical item is a processing unit; i.e., that the word is a language element that is manipulated during the planning of an utterance. Speech error data support this view, showing that individual words and morphemes are sometimes reshuffled during processing to create errors." Moreover, Shattuck-Hufnagel (1987:18) continues, "some of the structural subunits of the syllable do find support in error data in the form of errors that

involve movement or replacement of whole onsets, rhymes, nuclei and codas..." External evidence reviewed in this investigation demonstrates that onsets and rimes are processing units according to "models of the speech production planning process" because they are 1) reshuffeled or moved through processing to create onset-onset and rime-rime, and onset-rime slips of the tongue (MacKay 1972; Berg 1989), 2) manipulated during the planning of an utterance in attmepts at blending two monosyllables (Treiman 1988), and 3) replaced by like structures such as VC's for VC's in novel word games (Treiman 1983).

Moreover, linguistic processing theories identify prevocalic consonant(s) and the nucleus + post vocalic consonant(s) to be processing units. Node Structure theory exemplifies the point. In Node Structure theory, nodes represent "theoretical processing units" (MacKay 1992:42). Relevant to onset and rime structures, "lexical nodes prime specific phonological nodes, representing syllables (e.g., pre)" and "phonological compound nodes (e.g., pr)..." which are smaller than the syllable but larger than the phoneme. Specifically, the processing units called phonological compound nodes refer to an "initial consonant group" and/or "vowel group" (MacKay 1992:43), which precisely correspond to the O/PC and CC/VCC units revealed in Treiman (1988;1983) and the onset-onset, VC-VC exchanges in Berg (1989). The so-called onset/rime structures are actually processing units. (For a detailed description of Node Structure theory see MacKay (1987;1992)).

Because the onset and rime are processing structures directly involved in processing the subsyllable, they can not be directly relevant to the representation of knowledge of the internal organization of the syllable. Theorists concerned with linguistic processing view production and perception as skills not knowledge. In fact, theories that address language production are concerned with the underlying mechanisms and cognitive processes associated with skills in general. MacKay's (1987;1992) Node Structure theory, which incorporates language processing exemplifies the point. This theory was originally developed "not just to explain speech errors or even language production, but to address much more general issues: the mechanisms underlying sequencing and timing in behavior, the effects of practice on behavior, the speed-accuracy trade-off in the perception and production of skilled behavior, asymmetries in the ability to perceive as opposed to produce skilled behavior, the perception of ambiguous inputs, the use of perceptual feedback in monitoring skilled behavior, and the effects of delayed and amplified auditory feedback on the production of speech and other cognitive skills" (MacKay 1992:41). The onset and rime processing structures should not be used as evidence for representing knowledge (of the internal organization of the syllable) since processing structures are associated with skilled behavior not knowledge.

Organization of the Syllable and Internal Evidence

External evidence reveals how the linguistic processor organizes subsyllabic segments, but does the processor determine syllable structure? If so, knowledge of the internal organization of the syllable may turn out to be hierarchical. Moreover, what is the nature of the relationship between the representation of processing syllable internal segments and the representation of knowledge of the organization of intrasyllabic segments? (For a representation of the interface between subsyllabic processing and knowledge see section: An Interface Model: External Evidence, Internal Evidence and Processing Subsyllabic Knowledge.)

Linguistic knowledge in this paper refers to I(nternalized)-language (Chomsky 1986;1995). Representing I-language or "knowledge of language in informal usage" (Chomsky 1986:28) refers to the mental representation of rules in a system of rules that underlies the processing of speech (Chomsky 1986:27&41) . (For a discussion on I-language and knowledge of language see Chomsky (1986:1-50)).

Evidence from linguistic rules internal to the system of rules in language (internal evidence) suggests that the syllable is actually flat rather than hierarchical. Internal evidence for syllable structure incorporates intrasyllablic distributional constraints and stress assignment rules. A diagram of the syllable as a flat structure is given below.

S

onset N coda

Flat Syllable Structure and Evidence from Distributional Constraints

Distributional constraints of intrasyllabic segments argue directly against an onset/rime view of the syllable in both English and German. Well known coocurrence restrictions on intrasyllabic segments for the English syllable are offered in Clements and Keyser (1983) and Davis (1982). This evidence suggests that the prevocalic segment(s) and the peak of the syllable pattern together as a unit. Clements and Keyser (1983:20) claim that "coocurrence restrictions holding between the nucleus and preceding elements of the syllable appear to be just as common as coocurrence restrictions holding between the nucleus and the following elements." Examples of onset-nucleus (coda) restrictions given below (Clements and Keyser 1983:20-21) suggest a close relationship between a) the onset and peak, and b) the onset and the peak plus post vocalic consonants.

1. Voiced fricatives and /Cl/ clusters are excluded before /ʊ/
2. Anterior fricatives /f,v,s,z,θ,ð / are excluded before /u:r/
3. Stop plus /w/ clusters are excluded before /u:,ʊ,ʌ, aw/
4. /Cr/ clusters are excluded before /er,or,ar/

Pike & Pike (1947:87) describe prevocalic consonant(s)-nucleus coocurrence restrictions in the Mazateco syllable.

1. The vowel *o* may not be preceded by the consonant *v* or clusters with *v*.
2. The vowel *e* may not be preceded by the consonant *s*.
3. The vowel *i* may not be preceded by the consonant *ñ*.
4. The nasalized vowels have the same limitations, and in addition may not be preceded by *v* , *y* ,*l* ,*r* , or their clusters, nor by *m* ,*n* , *ñ*.

Restrictions between the prevocalic consonant(s) and post vocalic consonant(s) hold for the German syllable. Hall (1992:43-4) includes earlier work by Twaddel (1939-40) and Augst (1971) to illustrate the distributional constraints.

*pf+vowel+velar stop
*s/ʃ + [-cor] obstruent + vowel + obstruent, where the pre- and post vocalic obstruents share the same place features.

Flat Syllable Structure: Evidence from Stress Assignment

Davis (1982;1988) argues against the hierarchical onset/rime organization of the syllable and for a flat structure by using evidence from stress assignment rules. To posit a flat syllable based on stress assignment rules, combinations of intrasyllabic segments need to be important to the stating of the environmental conditions relevant to stress assignment. Under this view, the nucleus + post vocalic consonant(s) can not be considered more closely related to each other if the combinations pre + post vocalic consonant(s) and prevocalic consonant(s) + nucleus can also provide an environment in which stress rules may operate.

It is well known that the nucleus and/or nucleus + post vocalic consonant(s) are important to stress assignment in many languages (Halle and Vernaud 1980). However, other languages make use of prevocalic consonants in stress assignment. Offered in Davis (1988), "Western Aranda (an Arandic language of Australia) has a stress rule that places main stress on the initial

syllable if it begins with a consonant; otherwise stress falls on the second syllable" (Davis 1988:1). Pirahã is also analyzed as having onset-sensitive stress rules, and for "Madimadi, Italian and English data ... stress shift rules and destressing rules can be onset-sensitive" (Davis 1988:16).

In addition to the onset and nucleus + post vocalic consonant(s), the combinations onset + nucleus and onset + coda can also provide the environment for the statement of stress assignment rules. Citing Dixon (1977:40), Davis (1982:7-8) offers the following stress assignment rule from the Australian language Yidiny. "Stress is assigned to the first syllable involving a long vowel. If there is no long vowel, it is assigned to the first syllable of the word." Moreover, "if the third syllable of a trisyllabic word is closed and begins with a stop or w, and if the second syllable is open and begins with a lateral or rhotic, then vowel length and stress are likely to shift from second to third syllable." The long vowel provides the environment for stress in the initial statement for stress assignment. In addition, the combination pre + post vocalic consonant of the third syllable in a trisyllabic word are important to stating the environment for stress assignment together with the combination prevocalic consonant + nucleus of the second syllable. If the closed syllable represents a long rime similar to a long vowel, then this datum provides evidence for the combination prevocalic consonant + remainder of syllable, suggesting the prevocalic consonant is closely related to the rest of the syllable.

Summing up the argument for a flat syllable structure where no one subsyllabic element is more closely related to any other, Davis (1982:3) notes that coocurrence restrictions and language specific rule-environmental conditions demonstrate relationships between the "onset and peak as well as onset and coda...". Together with intrasyllabic distribution evidence, the fact that 1) the vocalic segment, 2) the vocalic segment + post vocalic consonant(s), 3) the prevocalic consonant(s), 4) the prevocalic consonant(s) + vocalic segment, and 5) the prevocalic consonant(s) + post vocalic consonant(s) are all important to stating the environment for stress assigment is interpreted as evidence suggesting that the nucleus is no more closely related to either the prevocalic or post vocalic consonant(s).

An Interface Model: External Evidence, Internal Evidence and Processing Subsyllabic Knowledge:

A coherent picture of the external (and internal) evidence reviewed in this study begins to emerge if we consider the syllable to be flat but processed hierarchically. Under this assumption, external evidence would reveal hierarchical structures and be relevant to the representation of the processing

of linguistic knowledge. Conversely, internal evidence would reveal a flat syllable structure and would be relevant to the representation of knowledge of the organization of intrasyllabic segments. The following considers one representation of the interface between knowledge of the internal organization of the syllable and the processing of that knowledge.

S

[onset] [N coda]
PB'o PB'o PB'r PB'r

P(rocessing) B(racekts) are associated with the flat representation of the syllable. PB'o(nset) applies to prevocalic consonants and PB'r(ime) operates on the nucleus + subsequent consonants. PB'o corresponds to the phonological compound node "initial consonant group" and PB'r corresponds to the "vowel group" in Node Structure theory. During linguistic processing relevant to subsyllabic segments, prevocalic consonant(s) are grouped together or organized by PB'o. Similarly, the nucleus and coda are organized by PB'r. Processing, then, gives the illusion of a hierarchical syllable structure because PB'o and PB'r chunk the syllable into two subsyllabic processing units. It is the processing units (the result of the application of the processing brackets) that interact in word blends, novel word games and slips of the tongue. It only appears that the nucleus and coda form a unit because they are chunked together for purposes of the production and perception of linguistic knowledge.

The interface model allows for arguments from processing theory that claim that processing units are revealed in speech error data (Shattuck-Hufnagel 1987:18) of the form prevocalic consonant(s) and nucleus + post vocalic consonant(s) (MacKay 1992: 43). In the model processing phenomena, onsets and rimes, are the result of the application of PB'o and PB'r on subsyllabic constituents. The interface model also shows how external evidence relevant to the subsyllabic level reveals hierarchical structures of the form onset and rime. Onset/rime breaks reported in MacKay (1972) and Berg (1989) and the onset/rime results in blend manipulation tasks that required subjects to form one syllable out of two (Treiman 1988) are explained in the following way. First syllable-internal segments are organized by the processing brackets which gives the illusion of hierarchical syllable structure. Then an error in the serial placement of the processing units yields subsyllabic breaks found in the external evidence. The relative ease of acquisition of novel word games that required onset/rime substitutions is explained by the shape of the units being manipulated. The substitution strings were easily processed

because they respected the boundaries of the processing brackets. When the substitutions took on other shapes such as C/CVCC or CCVC/C (non-processing units), acquisition became more difficult and less accurate (Treiman 1983). Under this view, acquisition can be facilitated if the structures being learned precisely coincide with processing architecture.

At this point in its development, the interface model is offered as an initial illustration of how the linguistic processor organizes syllable-internal segments. Processing may have to be hierarchical in nature due, in part, to speed constraints of on-line processing. The internal organization of the syllable may have to be flat to allow for all possible intrasyllabic relationships necessary for all possible segmental distributions and all possible environments for phonological rules relevant to the subsyllable. This model is not offered as a complete worked out representation of intrasyllabic processing. Many questions remain. For example, how are processing brackets applied/assigned? Why does one set only target consonants while the other set includes a vocalic segment? Does (degree of) sonority interact with processing brackets? Also, what is the nature of the relationship(s) between PB'o, PB'r and the articulatory mechanisms and comprehension strategies?

Conclusion

Many psycholinguistic studies have attempted to reveal syllable structure. Typically used in these studies are word blend tasks, novel word games, and speech error evidence. Noting "recent psycholinguistic evidence" from English, Levitt et al. (1991:337) state that such "evidence has suggested that the English syllables are organized hierarchically, divided first into an onset (consisting of the initial consonant or consonant cluster) and the rime (consisting of the following vowel and any additional consonants), with the rime further divided into a peak or nucleus (consisting of the vowel) and a coda (consisting of the remaining consonants)." I have argued that this is a misinterpretation of the external evidence. Rather than being "organized hierarchically," syllables are processed hierarchically.

The external evidence reflects the behavior of the units formed by the application of processing brackets. It is these units that interact in slips of the tongue, word blends, and novel word games. These units give the illusion of hierarchical syllable structure because they organize the syllable into two processing parts, the onset and rime. Moreover, external evidence is not directly relevant to the representation of knowledge of the internal organization of the syllable (in the sense of I-language) because such evidence reveals processing behavior, which is skilled behavior necessary to the production and perception of linguistic knowledge.

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